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An Assessment of

Development and Production Potential of Federal Coal Leases

Volume II—Working Papers

Part E:— Vol. II: Development and Production Potential of Undeveloped Federal Coal Leases and Preference Right Lease Applications in the Powder River Basin and Other Wyoming Coal Basins: Appendices and Supporting Documents

This is an OTA Working Paper that has neither been reviewed nor approved by the Technology Assessment Board

June 1984

CONGRESS OF THE UNITED STATES
Office of Technology Assessment
Washington, D. C. 20510

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OTA WORKING PAPER E

VOLUME II

DEVELOPMENT AND PRODUCTION POTENTIAL OF UNDEVELOPED FEDERAL COAL LEASES AND PREFERENCE RIGHT LEASE APPLICATIONS IN THE POWDER RIVER BASIN AND OTHER WYOMING COAL BASINS

APPENDICES AND SUPPORTING DOCUMENTS

NOVEMBER 1981

Prepared by

J. Russell Boulding
Senior Technical Analyst

and

Deborah L. Pederson
Project Research Assistant

For

THE CONGRESS OF THE UNITED STATES
OFFICE OF TECHNOLOGY ASSESSMENT
WASHINGTON, D.C. 20510

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PREFACE

This report was prepared under contract to the Office of Technology Assessment as part of the study of Federal coal leasing mandated by Section 10 of the Federal Coal Leasing Amendments Act of 1976, Public Law 94-377. OTA used the information and analyses in this report in the preparation of OTA's report, An Assessment of Development and Production Potential of Federal Coal Leases, December 1981. Information in this contractor report is current as of November 1981.

This report consists of two volumes. Volume I contains the results of the OTA Wyoming Task Force, the analysis of the development potential of undeveloped federal coal leases and preference right lease applications in the Powder River Basin of Wyoming and Montana and in other Wyoming coal basins, and a discussion of the need for additional leasing of Federal coal in these regions. Volume II contains the appendices, including detailed summaries of each undeveloped lease block and preference right lease application.

This report was prepared by J.Russell Boulding and Deborah L. Pederson with assistance by James J. Sebesta (Market analysis for Powder River Basin Coal) and by the U.S. Fish and Wildlife Service Western Energy Land Use Team (Rapid Assessment Methodology analysis of coal reserves and potential alluvial valley floors). Additional information and comments were provided by the members of the OTA Wyoming Coal Leasing Task Force. The contract was supervised by Dr. Audrey Buyrn, Program Manager, OTA Materials Progam, and by Dr. Michael Gargas McGrath, Senior Project Associate.

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OTA WORKING PAPER E

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TABLE OF CONTENTS

VOLUME II

(Appendices and Supporting Documents)

	Page
APPENDIX 1. WYOMING LEASE BLOCK INFORMATION	2
Table A.1.1 Wyoming Lease Block Identification List	2
Table A.1.2 Wyoming PRLA Block Identification List	7
Figure A.1 Wyoming Coal-Bearing Areas and Index of Coal Mine and Coal Lease Maps	11
Map Locations of Existing and Proposed Coal Mines:	
Map 1. Powder River Basin	12
Map 2. Southcentral Wyoming	13
Map 3. Southwest Wyoming	14
Lease and PRLA Location Maps:	
Map 1.1 to 1.8 Powder River Basin	15
Map 2.1 to 2.2 Southcentral Wyoming	22
Map 3.1 to 3.3 Southwest Wyoming	24
Map 3.4 Bighorn Basin	27
APPENDIX 2. LEASE AND PREFERENCE RIGHT LEASE APPLICATION BLOCK DATA	28
A Word About the Lease Block Key	29
Key to Filling Out the Lease Block Summary Sheets	30
Use of Screens to Evaluate Development and Production Prospects	32
Sources of Data for Lease Blocks	34
Table A.2.1 Summary of Undeveloped Lease Block Screening: Powder River Basin	36
Table A.2.2 Summary of Undeveloped Lease Block Screening: Southern Wyoming	37
Table A.2.3 Summary of PRLA Screening: Powder River Basin	38
Table A.2.4 Summary of PRLA Screening: Southern Wyoming	40
Undeveloped Lease Block Summary Sheets	41
PRLA Block Summary Sheets	65
APPENDIX 3. SUPPLEMENTAL DATA FOR WYOMING	111
Table A.3.1 Production Capacity and Reserves, Existing and Proposed Mines in the Powder River Basin, Wyoming	112
Table A.3.2 Production Capacity and Reserves, Existing and Proposed Mines in Southern Wyoming	116
Table A.3.3 Geotechnical Data, Developed Federal Leases in the Powder River Basin, Wyoming	119

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Table A.3.4 Geotechnical Data, Developed Federal Leases in Southern Wyoming 121

Table A.3.5 Detailed Demand/Production Projections for Powder River Basin 122

Table A.3.6 Detailed Demand/Production Projects for Southern Wyoming 123

APPENDIX 4. SUPPLEMENTAL DATA FOR MONTANA 124

Table A.4.1 Montana Lease Block Identification List 125

Map 4 Existing and Proposed Coal Mines, Southeastern Montana, and Index of Lease Maps 126

Maps 4.1 - 4.3 Lease Block Location Maps 127

Table A.4.2 Summary of Undeveloped Lease Block Screening: Montana Undeveloped Lease Summary Sheets 128

Table A.4.3 Production Capacity and Reserves, Existing and Proposed Mines in Montana 129

Table A.4.4 Geotechnical Data, Existing Mines in Montana 139

APPENDIX 5. WYOMING TASK FORCE AGENDA, INVITEES AND ATTENDEES 140

APPENDIX 6. USE OF THE USFWS WELUT RAPID ASSESSMENT METHODS PROCESS FOR EVALUATING EXISTING FEDERAL LEASES IN THE GILLETTE AREA 145

Background 146

Methods Used 146

Maps 6.1-6.2 Gillette Review Area 147

Results 152

Table A.6.1 Lease Data. Gillette Area 153

Table A.6.2 PRLA Data, Gillette Area 155

Table A.6.3 Alluvial Valley Floor Summary Table, Developed Coal Reserves, Powder River Basin 156

Table A.6.4 Strippable Coal Reserves with High and Moderate Coal Development Potential in Five Quadrangles, Campbell County, Wyoming 158

Conclusions 159

Procedures for Calculating Coal Reserves 162

Table A.6.5-9 Lease and PRLA reserves in different categories of overburden depth and stripping ratios, five quadrangles in the Gillette Area 164

NOTE: Full citations to references in this volume can be found at the end of Volume I.

APPENDIX 1

Table A.1.1	Wyoming Lease Block Identification List
Table A.1.2	Wyoming PRLA Block Identification List
Figure A.1	Wyoming Coal-Bearing Areas and Index of Coal Mine and Coal Lease Maps

Map Locations of Existing and Proposed Coal Mines:

Map 1.	Powder River Basin
Map 2.	Southcentral Wyoming
Map 3.	Southwest Wyoming

Lease and PRLA Locations Maps:

Maps 1.1 to 1.8	Powder River Basin
Maps 2.1 to 2.2	South Central Wyoming
Maps 3.1 to 3.3	Southwest Wyoming
Map 3.4	Bighorn Basin

TABLE A.1.1 WYOMING LEASE BLOCK IDENTIFICATION LIST

BLOCK #	BLOCK NAME	OWNER/PARENT COMPANY	COUNTY	SERIAL NO.(S)	DATE ISSUED	ACRES	DEVELOPMENT STATUS	MAP #
1	Armstrong	Big Horn Coal Co.	Sheridan	B025369	5/17/30	80	U	1.1
2	Bass	Richard Bass Trust Estate	Sheridan	W961	12/1/67	20,701	U	1.2
3*	Gulf (1) (Arvada)	Gulf Oil Corp.	Sheridan	W0236507	3/1/65	195	U	1.2
4	Gulf (2) (Arvada)	Gulf Oil Corp.	Sheridan	W0236621 W0240559	6/1/63 9/1/63	2551 1620 4171	U	1.2
5	Lake DeSmet	Texaco, Inc.	Johnson	W030052 W046349 W051959 W030009 W0321120	11/1/59 10/1/61 8/1/59 12/1/55 5/1/66	2203 160 320 1913 4821 9417	U	1.4
6	Belco	Belco Petroleum	Johnson	W0322794	1/1/70	4551	U	1.4
7	Wildcat	Gulf Oil Corp.	Campbell	W0220516	3/1/65	1571	U	1.5
8	Blue Diamond	Wyodak Resources/ Black Hills P&L	Campbell	B037423	2/22/44	40	U	1.5
9	Buckskin	Shell Oil Co.	Campbell	W0325878	11/1/67	599	D	1.5
10	Rawhide	Carter Mining Co./ Exxon	Campbell	W5036	12/1/67	5457	D	1.5
11	Eagle Butte	Amax Coal Co./ Amax Inc.	Campbell	W0313773	9/1/65	3520	D	1.5
12	Dry Fork	Cities Service	Campbell	W0271199 W0271200 W0271201	12/1/67 12/1/67 12/1/67	640 760 2180 3580	U	1.5
13	S. Rawhide	Carter Mining Co./ Exxon	Campbell	W5035	12/1/67	4782	U	1.5

*Lease blocks 3 & 4 were initially defined by OTA as separate development blocks. Gulf considers the two leases to be a single block called "Arvada" but since the 2 leases are separated by several miles of unleased Federal coal, they were evaluated separately.

TABLE A.1.1 (continued)

BLOCK #	BLOCK NAME	OWNER/PARENT COMPANY	COUNTY	SERIAL NO.(S)	DATE ISSUED	ACRES	DEVELOPMENT STATUS	MAP #
14	East Gillette Federal	Kerr McGee Coal/ Kerr McGee Corp.	Campbell	W0311810 W0312311 W0313668	1/1/70 7/1/65 10/1/65	1263 880 2200 4343	U	1.5
15	Wyodak	Wyodak Resources/ Black Hills Power and Light Co.	Campbell	W0111833 W0313666 W073289	4/1/61 10/1/65 5/1/59	80 1560 240 1880	D	1.5
16	Gulf (3)	Gulf Oil Corp.	Campbell	W0256663	3/1/65	756	U	1.6
17	Peabody (1) (East Wyodak)	Peabody Coal Co.	Campbell	W0313667	10/1/65	2560	U	1.6
18	Caballo	Carter Mining Co./ Exxon	Campbell	W3397 W49644	12/1/67 9/1/65	5280 80 5360	D	1.6
19	Belle Ayre	Amax Coal Co./ Amax Inc.	Campbell	W0317682	9/1/65	2360	D	1.6
20*	Prong Horn	Consolidation Coal Co./Conoco & Mobil	Campbell	W58112	2/1/71	840	D	1.6
21	Rojo Caballos	Mobil Oil Corp.	Campbell	W23929	2/1/71	3160	D	1.6
22	Cordero	Sunoco Energy Dev./ The Sun Co.	Campbell	W8385	3/1/71	6560	D	1.6
23	Coal Creek	Arco	Campbell	W3446	11/1/67	5806	D	1.6
24	Jacobs Ranch	Kerr McGee Coal/ Kerr McGee Corp.	Campbell	W23928 W24710	9/1/70 9/1/70	4192 160 4352	D	1.7
25	Black Thunder	Thunder Basin Coal Co./Arco	Campbell	W2313 W36094	12/1/66 12/1/66	5844 40 5884	D	1.7
26	N. Rochelle	Shell Oil Co.	Campbell	W71692	12/1/66	2000	U	1.7

*Consol assigned its interest in the Pronghorn lease to Mobil in late 1980. The lease will be mined in conjunction with Block 21 (Rojo Caballos).

TABLE A.1.1 (continued)

BLOCK #	BLOCK NAME	OWNER/PARENT COMPANY	COUNTY	SERIAL NO.(S)	DATE ISSUED	ACRES	DEVELOPMENT STATUS	MAP #
27	Rochelle	Peabody Coal Co.	Campbell	W0321779 W37829	12/1/66 12/1/66	8781 40 8821	U	1.7
28	N. Antelope	N. Antelope Coal/ Peabody & Panhandle Eastern	Campbell	W60231	12/1/66	320	U	1.7
29	Antelope	NERCO, Inc./Pacific Power & Light	Converse	W0321780 W0322255 B031719	12/1/66 12/1/66 11/22/32	2908 1869 40 4817	U	1.7
30 *	Phillips Creek (1)	Sunoco Energy Dev./ The Sun Co.	Converse	W0136194 W0136195 W0136196 W0324701	6/1/61 6/1/61 6/1/61 2/1/70	322 1477 1560 680 4039	U	1.8
31	Phillips Creek (2)	Sunoco Energy Dev./ The Sun Co.	Converse	W0310712	12/1/66	40	U	1.8
32	Dave Johnston	Pacific Power and Light Co.	Converse	C054769 W0244167 W0312918 W038597 W038602 W041355	5/31/33 6/1/63 6/1/65 8/1/58 6/1/56 7/2/56	120 1803 3779 1400 2000 560 9662	D	1.8
33	Carbon No. 1	Carbon County Coal **	Carbon	W0150169 W054728	1/1/64 11/1/61	640 640 1280	D	2.1
34	Rosebud	Rosebud Coal Sales	Carbon	C057086 *** W48330	4/5/35 2/1/80	1273 130 1403	D	2.1

*Assigned to PP&L in early 1981. Will probably be developed as an extension of the Dave Johnston Mine (Block 32).

**These leases are actually held by Ark Land Company and were surface mined as part of Seminoe No. 2 (Block 35).

***Carbon County Coal (Block 33) will underground mine 320 acres of this lease after Rosebud Coal Sales has strip mined the shallow deposits.

TABLE A.1.1 (continued)

BLOCK #	BLOCK NAME	OWNER/PARENT COMPANY	COUNTY	SERIAL NO.(S)	DATE ISSUED	ACRES	DEVELOPMENT STATUS	MAP #
35	Seminoe No. 2	Ark Land Co./Ashland Oil & Hunt Interests	Carbon	W49338 C033800 C078051 W0146199 W054727 W054737 W31258	8/1/80 10/8/24 5/1/51 1/1/64 11/1/61 11/1/61 5/1/51	735 398 160 640 1264 320 160 3677	D	2.1
36	Hanna South	Ark Land Co./AO & HI	Carbon	W25406	1/1/71	640	U	2.1
37	Vanguard No. 2 (Energy Pits)	Energy Dev. Co./Iowa Public Service	Carbon	W16465	9/1/69	8683	D	2.1
38	Medicine Bow	Medicine Bow Coal Co.	Carbon	W58095 W42554	10/1/80 2/1/71	1288 1280 2568	D	2.1
39	Seminoe No. 1	Ark Land Co./AO & HI	Carbon	W16466	2/1/71	6315	D	2.1
40	Cherokee	NERCO, Inc./Pacific Power & Light	Carbon & Sweetwater	W0312917 W092141 W0313559 W092140	4/1/67 7/1/62 6/1/65 7/1/62	480 2480 640 671 4271	U	2.2
41	Peabody (2) (Boars Tusk)	Peabody Coal Co.	Sweetwater	W0220486 W3438	4/1/67 3/1/70	1840 640 2480	U	3.1
42	Long Canyon	Sunoco Energy Dev./ The Sun Co.	Sweetwater	W0313201	7/1/68	14680	U	3.1
43	Stansbury	Stansbury Coal Co.	Sweetwater	W12793	6/1/70	1645	D	3.1
44	Rainbow	Sweetwater Resources	Sweetwater	E015155	9/19/27	1752	U	3.1
45	Jim Bridger	Bridger Coal Co./ Pacific Power & Light	Sweetwater	W0313558 W2727 W2728	1/1/68 10/1/69 10/1/69	4276 2880 1280 8436	D	3.1
46	Black Butte	Black Butte Coal Co./ Peter Kiewit Sons & Rocky Mountain Energy	Sweetwater	W6266	4/1/76	14902	D	3.1

TABLE A.1.1 (continued)

BLOCK #	BLOCK NAME	OWNER/PARENT COMPANY	COUNTY	SERIAL NO.(S)	DATE ISSUED	ACRES	DEVELOPMENT STATUS	MAP #
47	North-North Block	Kemmerer Coal Co./ The Lincoln Corporation	Lincoln	W075206	1/2/59	1247		
48	North Block	Kemmerer Coal Co./ The Lincoln Corporation	Lincoln	W075207B W0294513 H056471 W060274	1/2/59 7/1/64 4/1/62 2/1/63	408 519 960 745 2632	U	3.2
49*	Twin Creek	Cumberland Coal Co./ RME & PKS	Lincoln	W075207A	1/2/59	306	U	3.2
50	Elkol-Sorenson	Kemmerer Coal Co./ The Lincoln Corporation	Lincoln	W055246	3/1/58	2401	U	3.2
51	Skull Point	FMC Corp.	Lincoln	W061421 W061422	3/1/63 3/1/63	1280 1921 3201	D	3.2
52	South Haystack	Cumberland Coal Co. PKS & RME	Uinta	W060241	3/1/63	1408	U	3.2
53	Cottonwood	Connotton Land Co./ Cravat Coal Co.	Sublette	E018804	3/28/38	160	U	3.3
54**	Deadman	Connotton Land Co./ Cravat Coal Co.	Lincoln	W023373	2/1/58	240	U	3.3
55***	Granite Creek	Granite Creek Coal Co.	Teton	E019039	3/11/41	280	U	3.3
56	Kowlok	Northwest Resources	Hot Springs	C069111	12/1/45	120	U	3.4
57	Western Nuclear	Western Nuclear/ Phelps Dodge Corp.	Hot Springs	W022978	8/1/54	80	U	3.4

*Will be integrated into North Block LMU (Block 48).
**Assigned to parrow Resources in early 1980.
***Lease relinquished in late 1980.

TABLE A.1.2 WYOMING PRLA BLOCK IDENTIFICATION LIST

BLOCK #	BLOCK NAME	OWNER/PARENT COMPANY	COUNTY	SERIAL NO.(S)	ACRES	MAP #
P1	Woodson	Frederick C. Woodson	Sheridan	W3818	1520	1.1
				W3819	3999	
					5519	
P2	Thunderbird	El Paso Coal Co./ The El Paso Co.	Campbell & Johnson	W1598	3800	
				W1599	3998	
				W2275	320	
				W4995	760	
				W4996	2616	
				W56843	801	
				W56844	1799	
				W56845	3600	
				W58482	480	
				W58483	1554	
				W58484	1442	
				W58485	2758	
					23928	
P3[1]	Wold-Jenkins(1)	John S. Wold & Page T. Jenkins	Johnson	W59444	400	1.3
				W59464	997	
				W2276	3815	
				W59461	1112	
				W59463	1037	
					7361	
P4[2]	Wold-Jenkins(2)	John S. Wold & Page T. Jenkins	Campbell & Johnson	W1595	4640	1.3
				W4997	2668	
				W1596	2520	
				W16313	2205	
				W4998	1737	
					13770	

[1] Lease #W5944 not on base map.

[2] Small section of lease W1596 (P4) located in P5; of lease W2273 (P6) in P4; and of lease W2274 (P5) in (P4)

TABLE A.1.2 (continued)

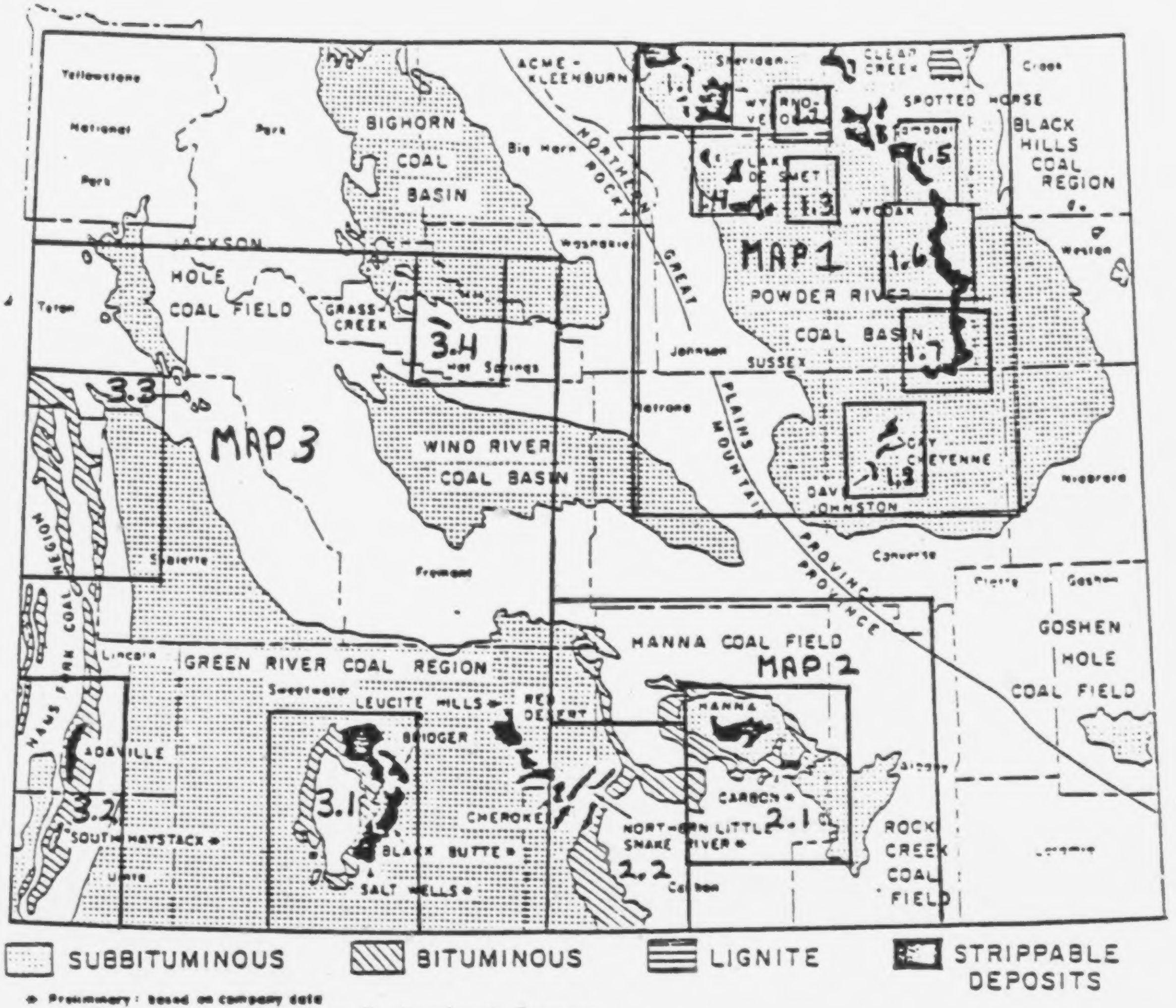
BLOCK #	BLOCK NAME	OWNER/PARENT COMPANY	COUNTY	SERIAL NO.(S)	ACRES	MAP #
P5	Wold-Jenkins(3)	John S. Wold & Page T. Jenkins	Campbell	W1597 W2274	238 1517 1755	1.3
P6	Wold-Jenkins(4)	John S. Wold & Page T. Jenkins	Campbell	W2273	1002	1.3
P7	Consol (1)	Consolidation Coal Co./ Conoco	Campbell	W11128 W8312 W8307	999 1575 3036 5610	1.5
P8	Consol(2)	Consolidation Coal Co./ Conoco	Campbell	W8308 W8309	2544 1990 4534	1.5
P9	Consol(3)	Consolidation Coal Co./ Conoco	Campbell	W8310 W8311	1200 2440 3640	
P10	Peabody (P1)	Peabody Coal Co.	Campbell	W26198 W26199 W32061 W32062	2508 640 80 160 3388	1.6
P11	Peabody (P2)	Peabody Coal Co.	Campbell	W32063	520	1.6
P12	Wold-Jenkins(5)	Wold-Jenkins	Campbell	W9036	80	1.6
P13	Arco (1)	Arco	Campbell	W16877	357	1.7
P14	Arco (2)	Arco	Campbell	W16876 W23932	120 120 240	1.7
P15	Peabody (P3)	Peabody Coal Co.	Campbell	W25717 W32064 W32065 W25718	200 1560 280 160 2200	1.7

TABLE A.1.2 (continued)

BLOCK #	BLOCK NAME	OWNER/PARENT COMPANY	COUNTY	SERIAL NO.(S)	ACRES	MAP #
P16	N. Antelope (1)	North Antelope Coal Co./ Peabody & Panhandle Eastern	Campbell	W32068 W60638	120 120 240	1.7
P17	N. Antelope (2)	North Antelope Coal Co./ Peabody & Panhandle Eastern	Converse	W25719 W32067	1160 80 1240	1.7
P18	Peabody (P4)	Peabody Coal Co.	Converse	W32506	835	1.7
P19	Peabody (P5)	Peabody Coal Co.	Converse	W916 W917	3318 320 3638	
P20	Western Fuels (1)	Western Fuels	Converse	W12767 W14390 W14392	1281 3928 3655 8864	1.8
P21	Western Fuels (2)	Western Fuels	Converse	W14355	4352	1.8
P22	Dixie (1)	Dixie Natural Res.	Converse	W21515	800	1.8
P23	Dixie (2)	Dixie Natural Res.	Converse	W21516	2276	1.8
P24	Kemmerer (1)	Kemmerer Coal Co.	Carbon	W0324041	5010	2.2
P25	Kemmerer (2)	Kemmerer Coal Co.	Carbon	W0324037	4816	2.2
P26	Kemmerer (3)	Kemmerer Coal Co.	Carbon	W0324035	4510	2.2
P27	Kemmerer (4)	Kemmerer Coal Co.	Carbon	W0324038	5079	2.2
P28	Kemmerer (5)	Kemmerer Coal Co.	Carbon	W0324034 W0324036	4515 480 4995	2.2

TABLE A.1.2 (continued)

BLOCK #	BLOCK NAME	OWNER/PARENT COMPANY	COUNTY	SERIAL NO.(S)	ACRES	MAP #
P29	Kemmerer (6)	Kemmerer Coal Co.	Carbon	W0324042	4881	2.2
P30	Rosebud	Rosebud Coal Sales Co./ Peter Kiewit, Sons'	Sweetwater	W0308922 W0308923	795 2233 3028	3.1
P31	Salt Wells	Peabody Coal Co.	Sweetwater	W16431	2880	3.1
P32	Bean Springs	Ark Land Co./AO & HI	Sweetwater	W19187 W19188 W19189 W19190	2240 2560 2029 1373 8202	3.1



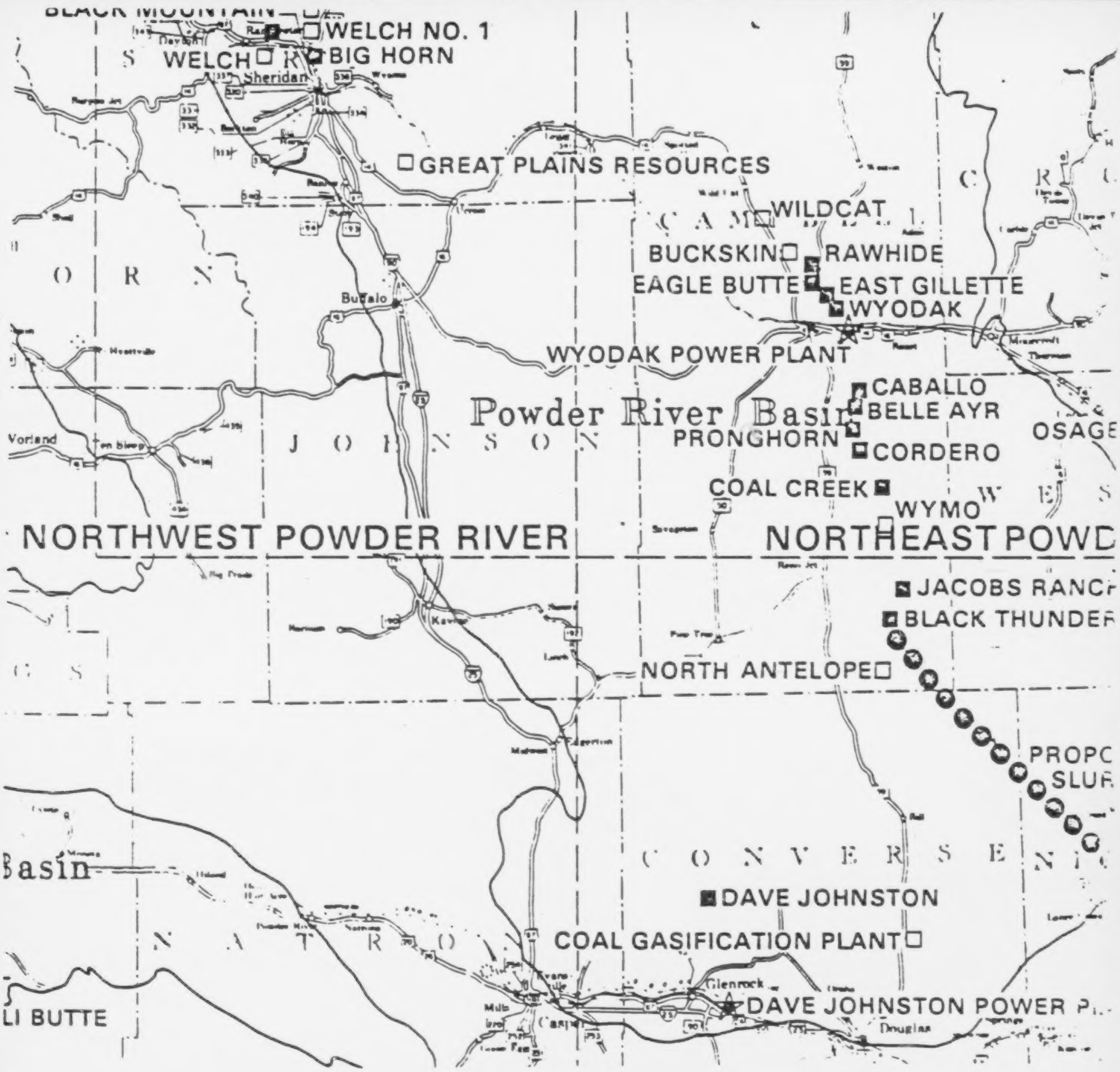
Base Map: Wyoming Geological Survey

Figure A.1 Wyoming Coal-Bearing Areas and index of coal mine and coal lease maps

Map 1. Powder River Basin: Existing and Proposed Coal Mines
Map 1.1 to 1.8 : Coal Leases and PRLAs

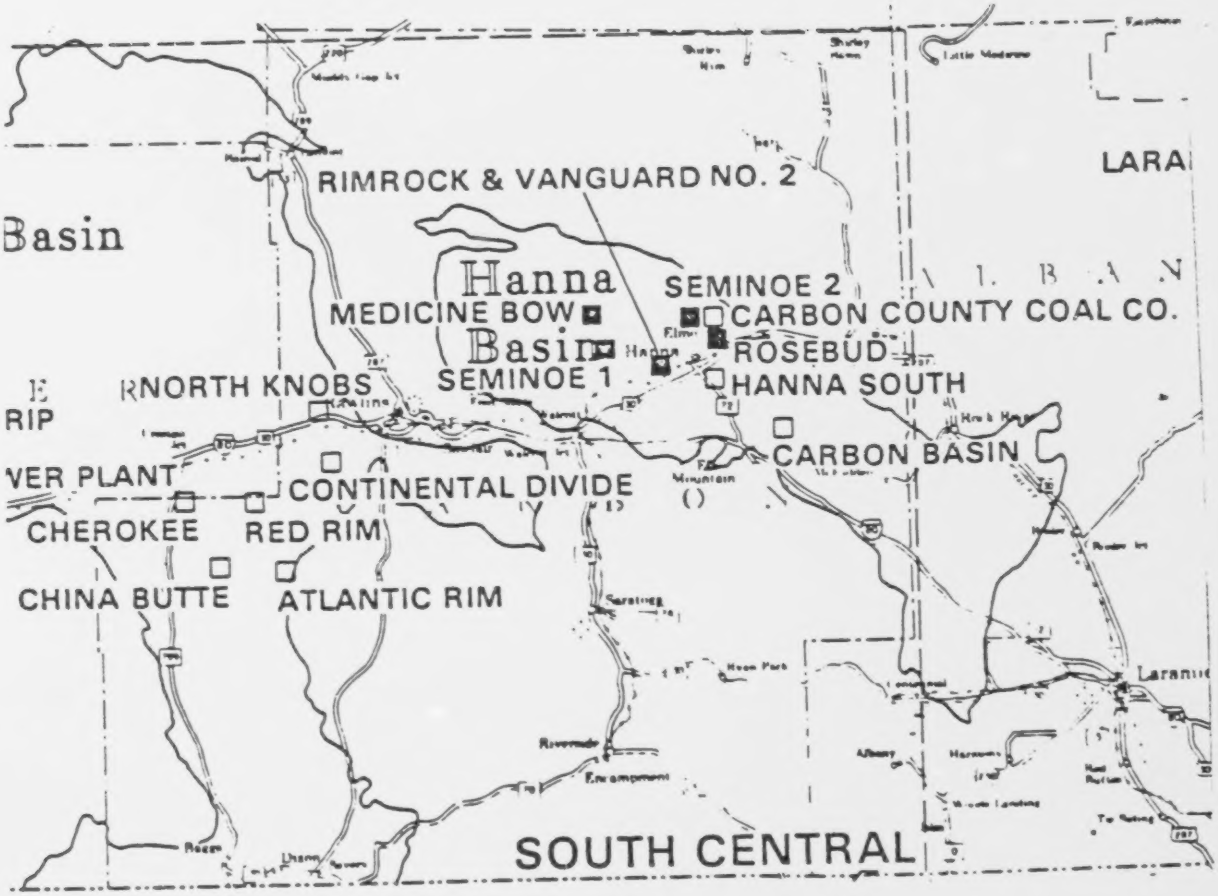
Map 2. Southcentral Wyoming: Existing and Proposed Coal Mines.
Map 2.1 - 2.2 Coal Leases and PRLA's.

Map 3. Southwest Wyoming and Bighorn Basin: Existing and Proposed Coal Mines.
Map 3.1 - Green River Coal Leases and PRLAs
Map 3.2 - 3.3 - Ham's Fork Coal Leases.
Map 3.4 - Bighorn Basin Coal Leases.



Source: Lane and Miller (1978)

Map 1. Existing and Proposed Mines in Powder River Basin. Other leases with favorable development prospects not shown on map are: Lake DeSmet, Mobil (non-federal), Consol PRLAs (2 possible mines, uncertain development prospects) South Rawhide, North Rochelle, Rochelle, Antelope and Dry Fork.

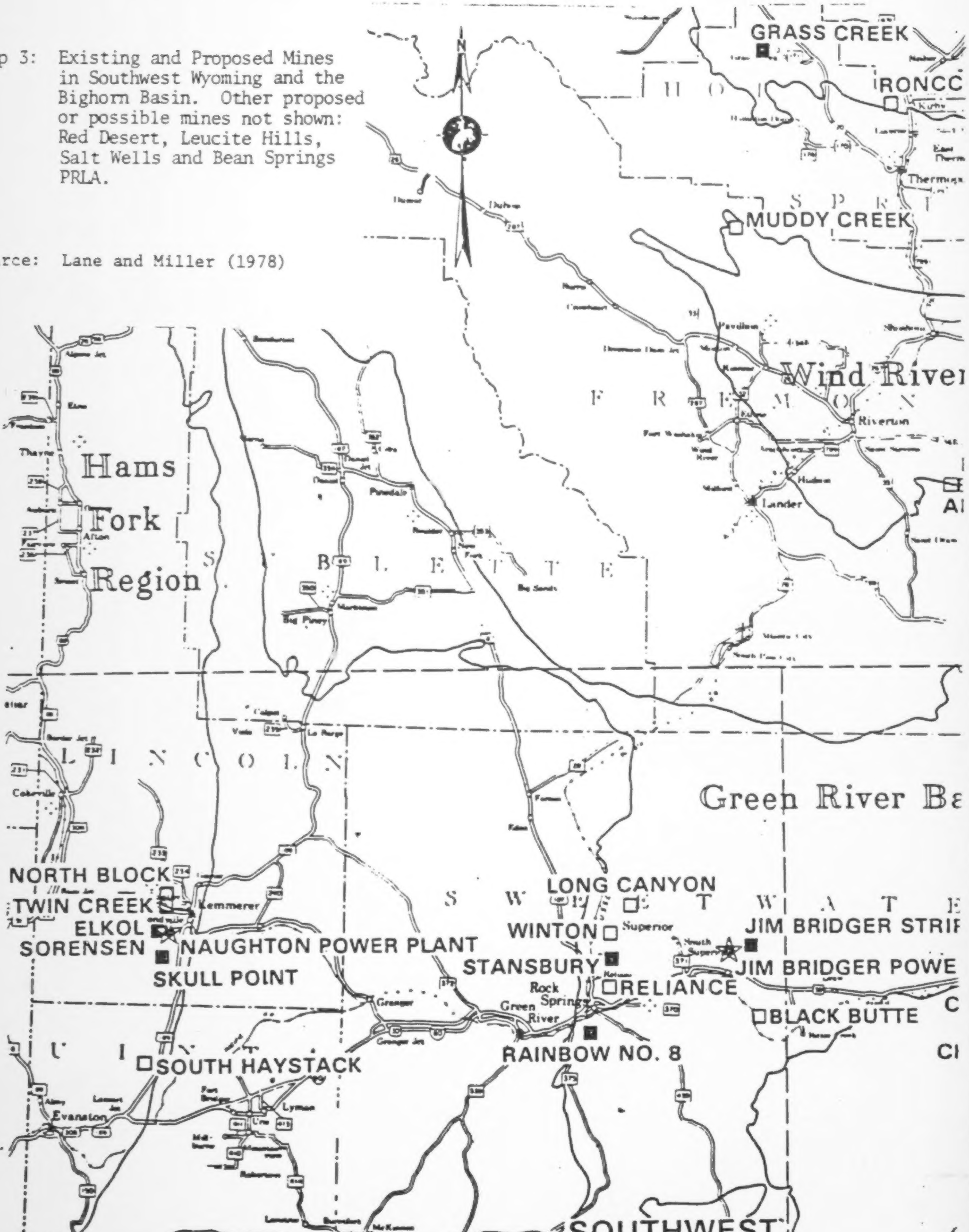


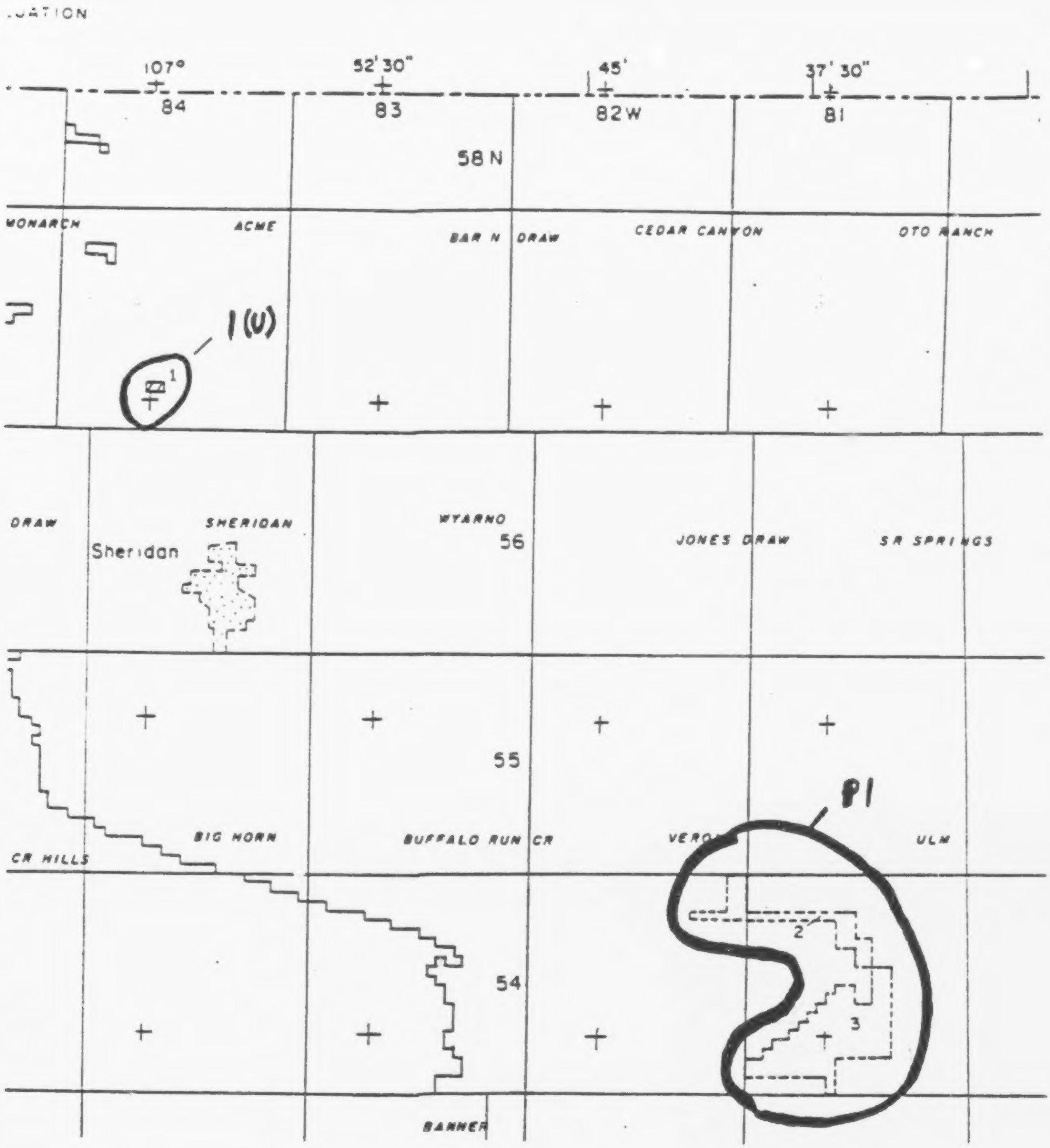
Source: Lane and Miller (1978)

Map 2: Existing and Proposed Mines in Southcentral Wyoming. Production from the following mines is anticipated by 1990 (Glass 1980): Hanna South, Carbon Basin, Red Rim, China Butte. Other proposed mines not shown: Corral Canyon.

Map 3: Existing and Proposed Mines in Southwest Wyoming and the Bighorn Basin. Other proposed or possible mines not shown: Red Desert, Leucite Hills, Salt Wells and Bean Springs PRLA.

Source: Lane and Miller (1978)



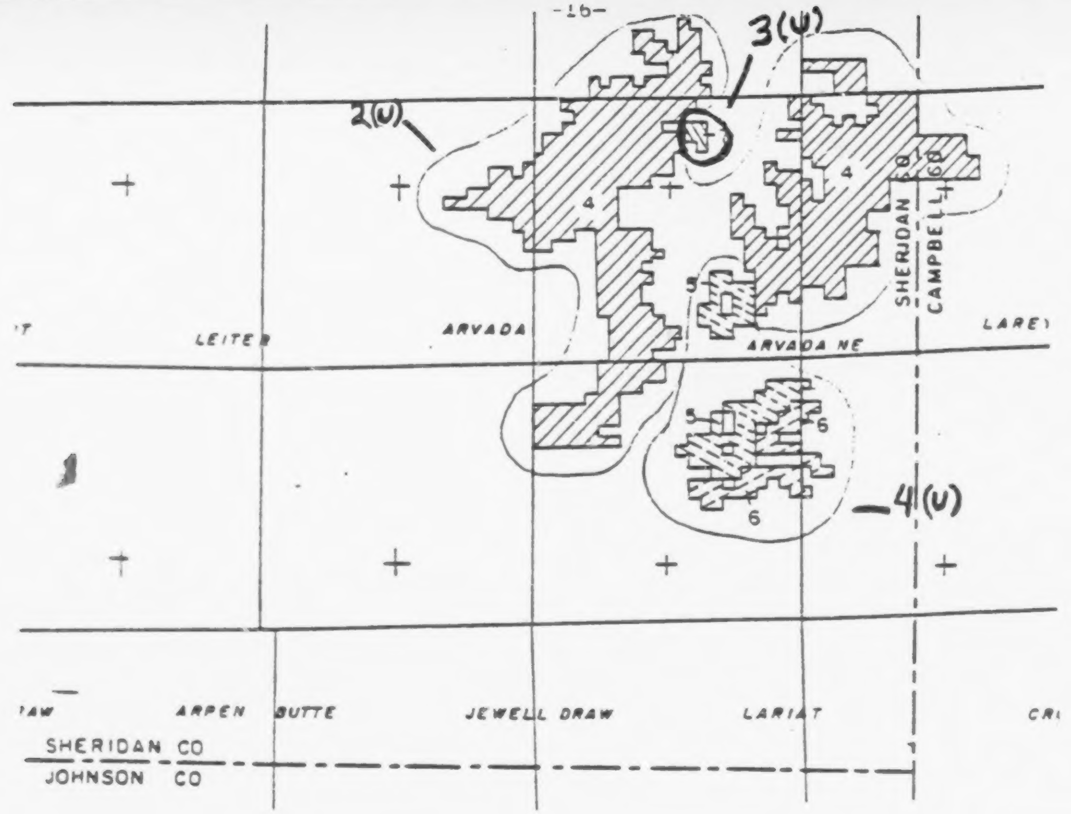


MAP 1.1 - LEASES AND PRLA'S: SHERIDAN AREA

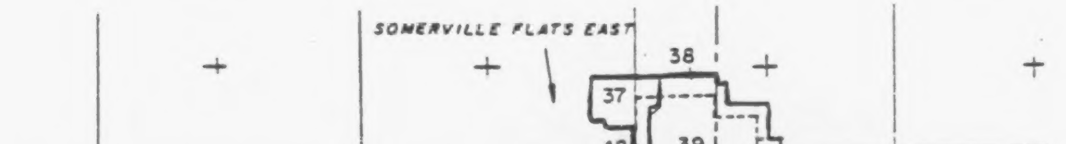
U = UNDEVELOPED

D = DEVELOPED

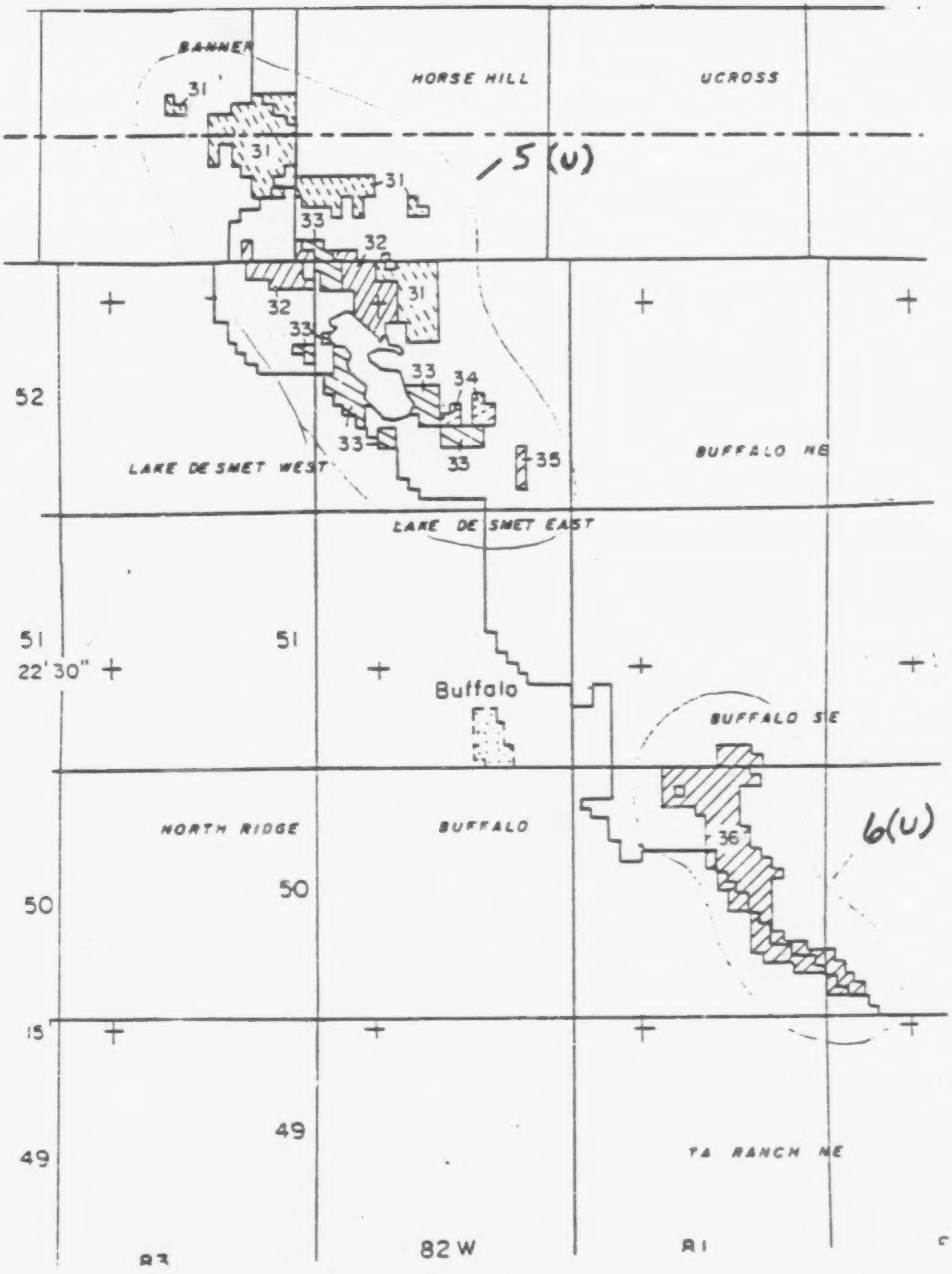
P = PRLA



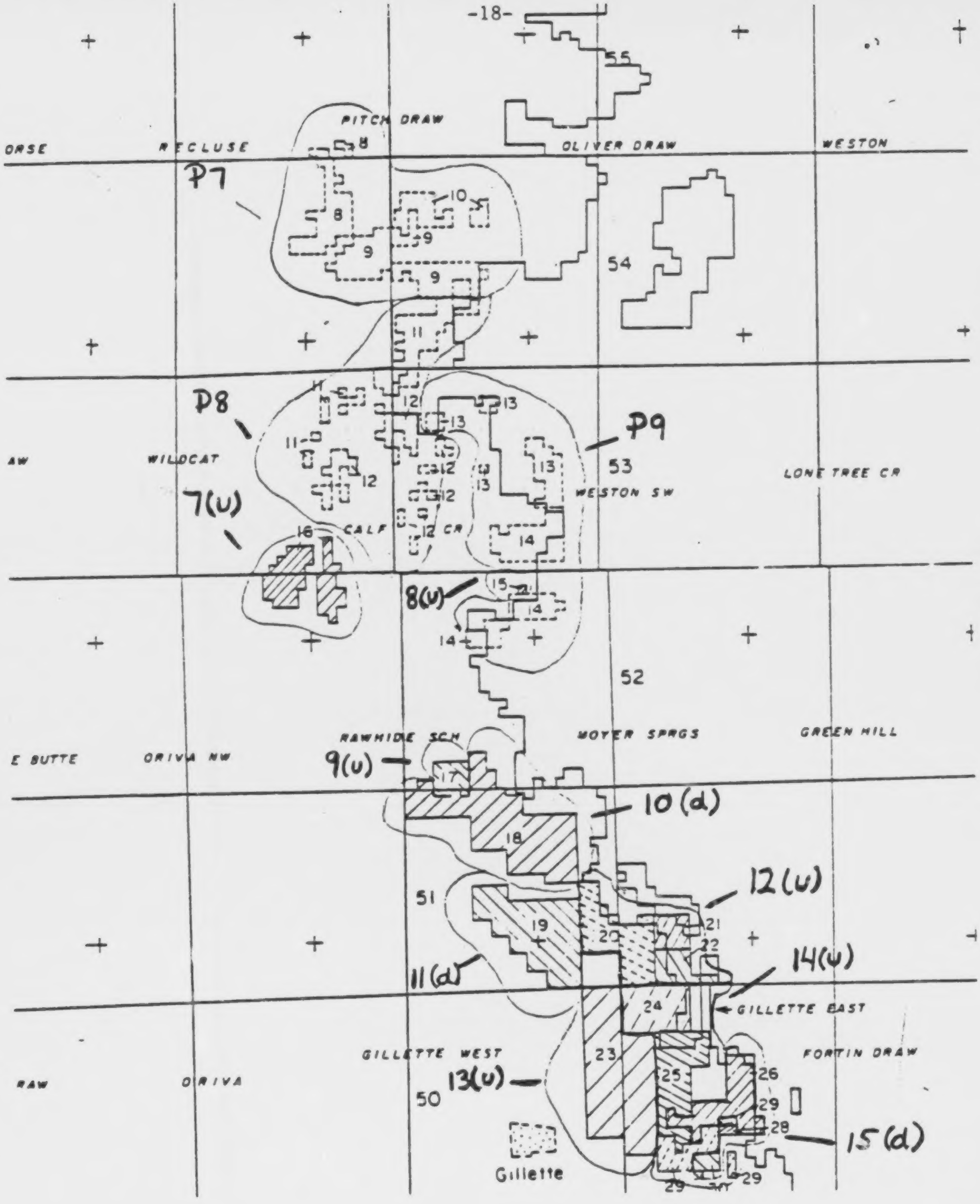
MAP 1.2 - LEASES: EASTERN SHERIDAN COUNTY



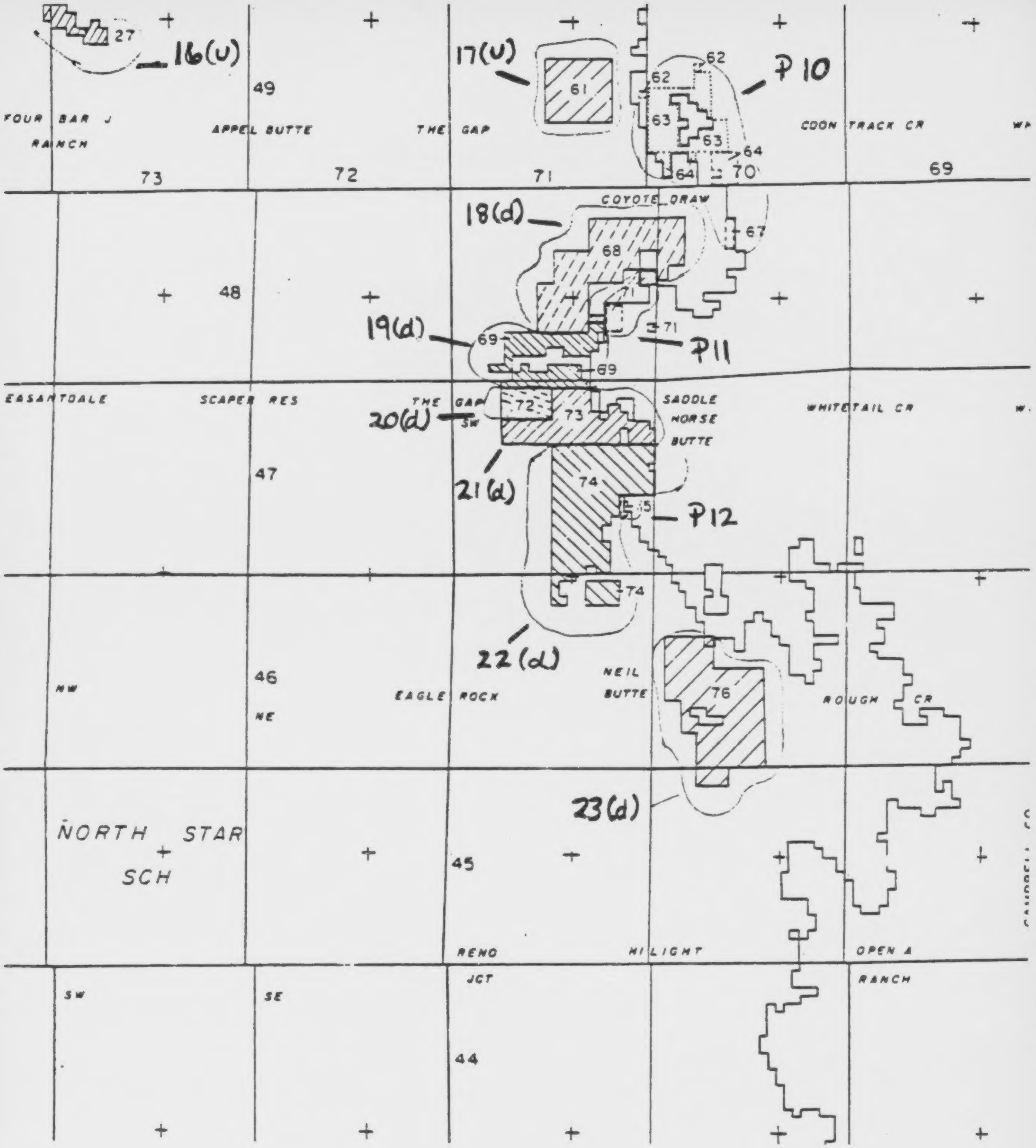
MAP 1.3 - PRLA'S: JOHNSON - CAMPBELL COUNTY



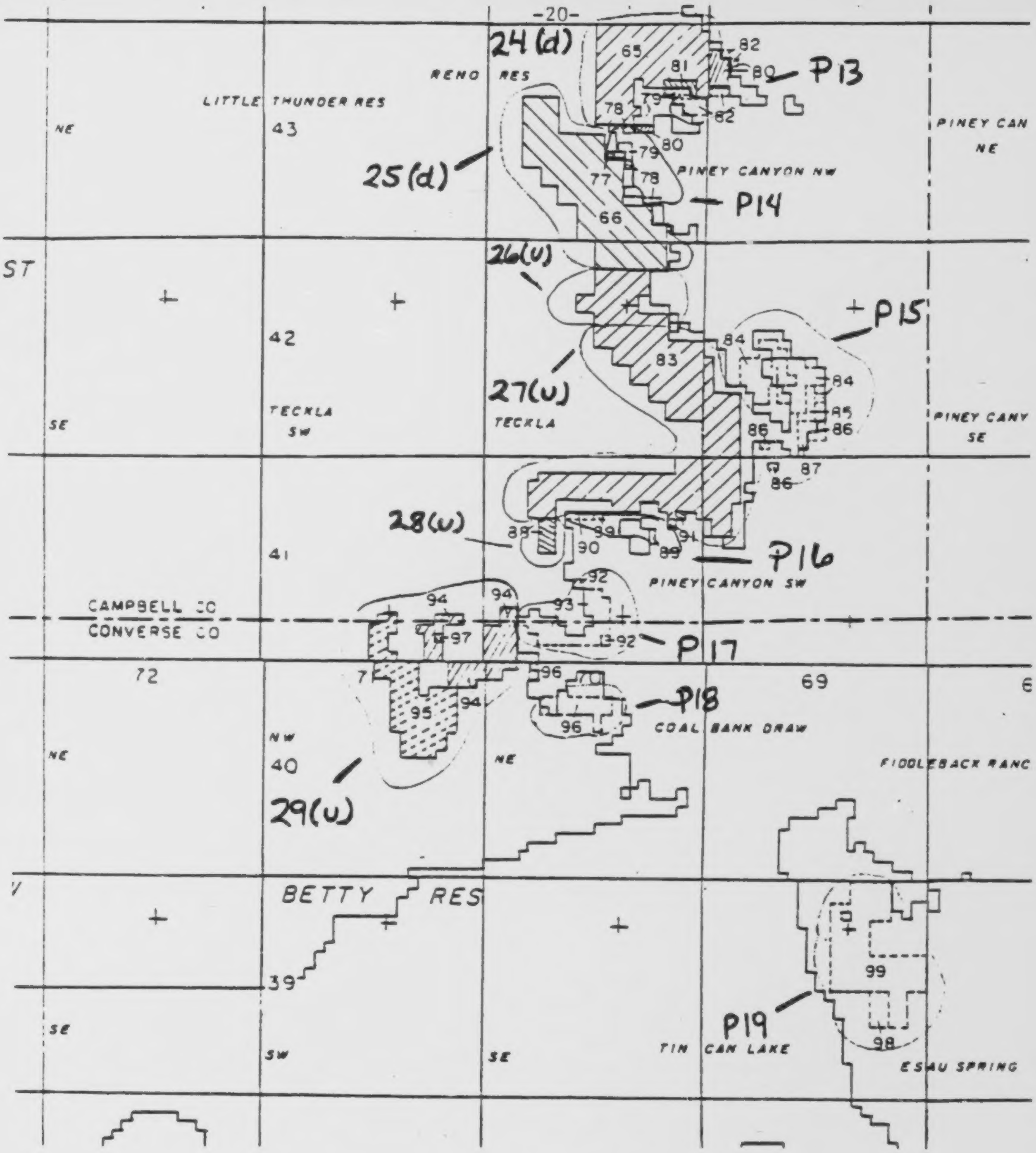
MAP 1.4 - LEASES: BUFFALO AREA, JOHNSON AREA



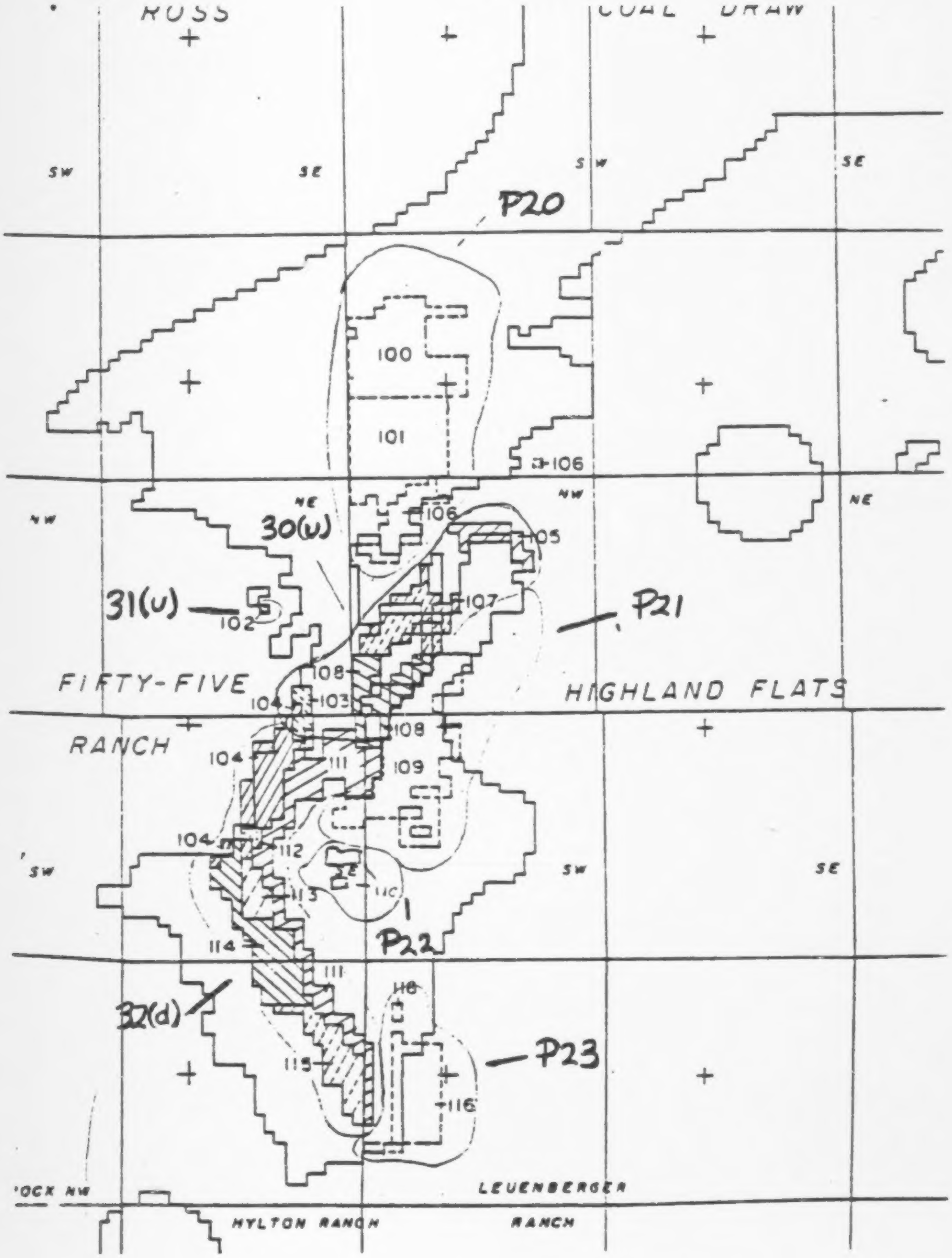
MAP 1.5 - LEASES AND PRLA'S: NORTHERN CAMPBELL COUNTY



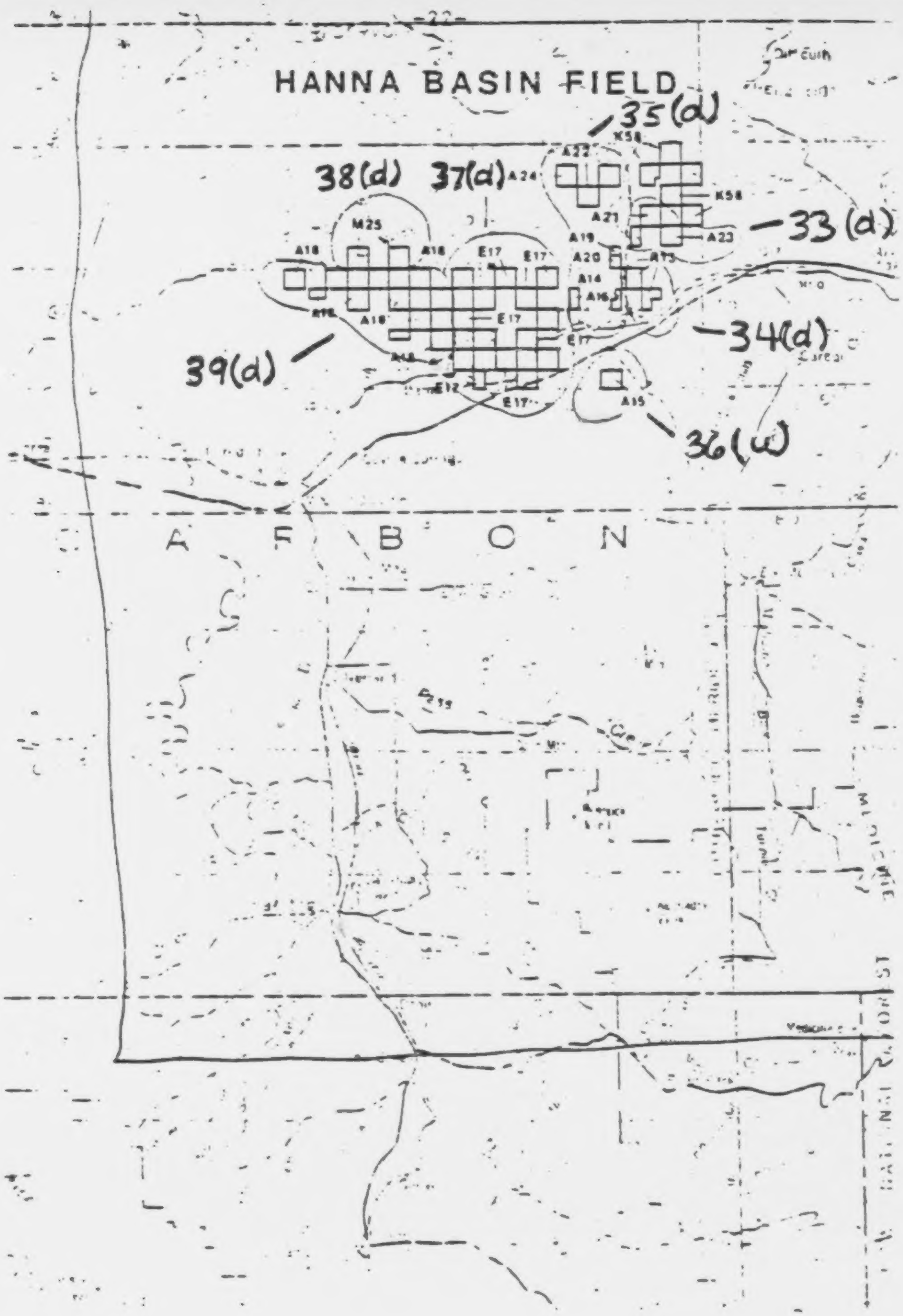
MAP 1.6 - LEASES AND PRLA'S: CENTRAL CAMPBELL COUNTY



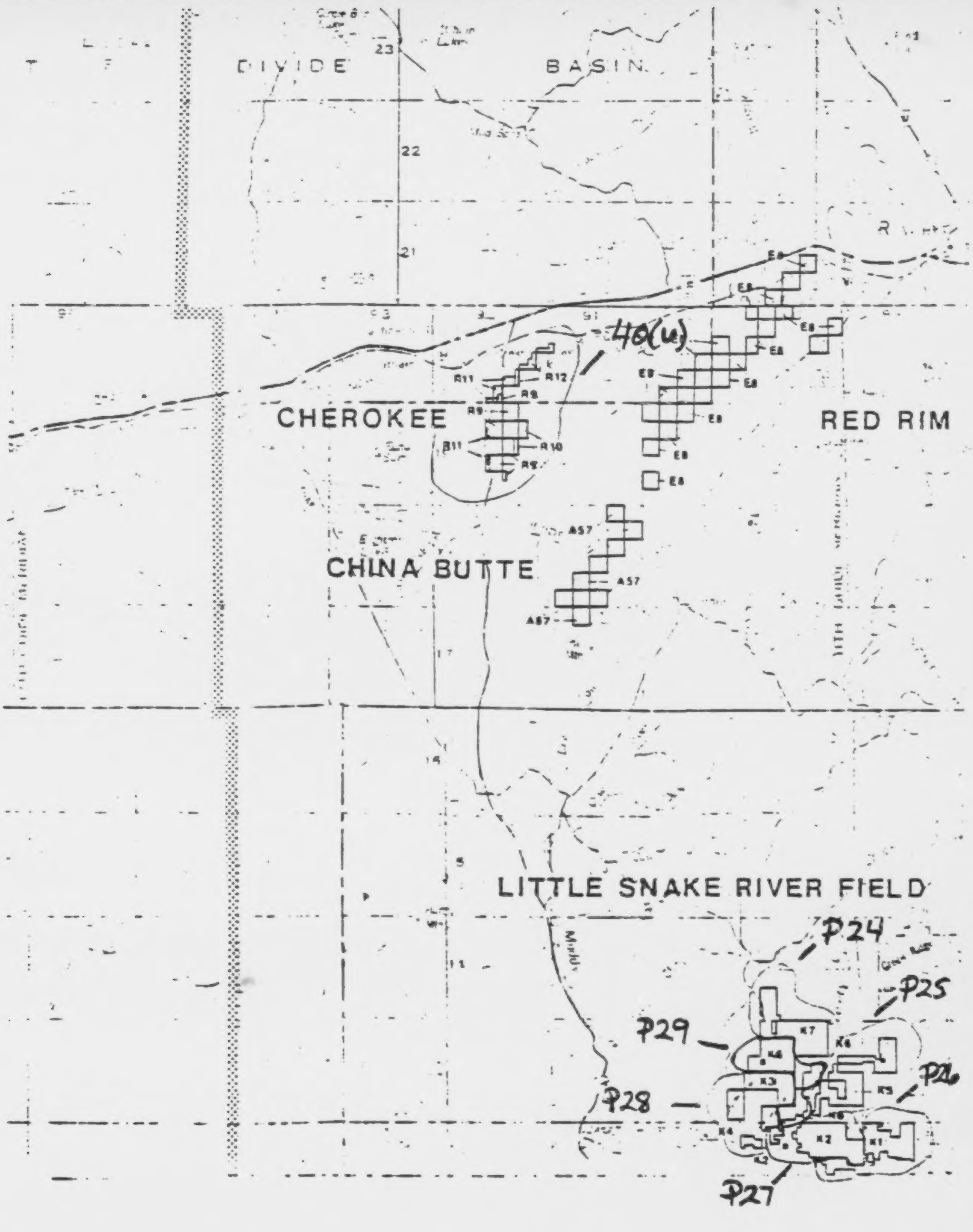
MAP 1.7 - LEASES AND PRLA'S: SOUTHERN CAMPBELL, NORTHERN CONVERSE COUNTY



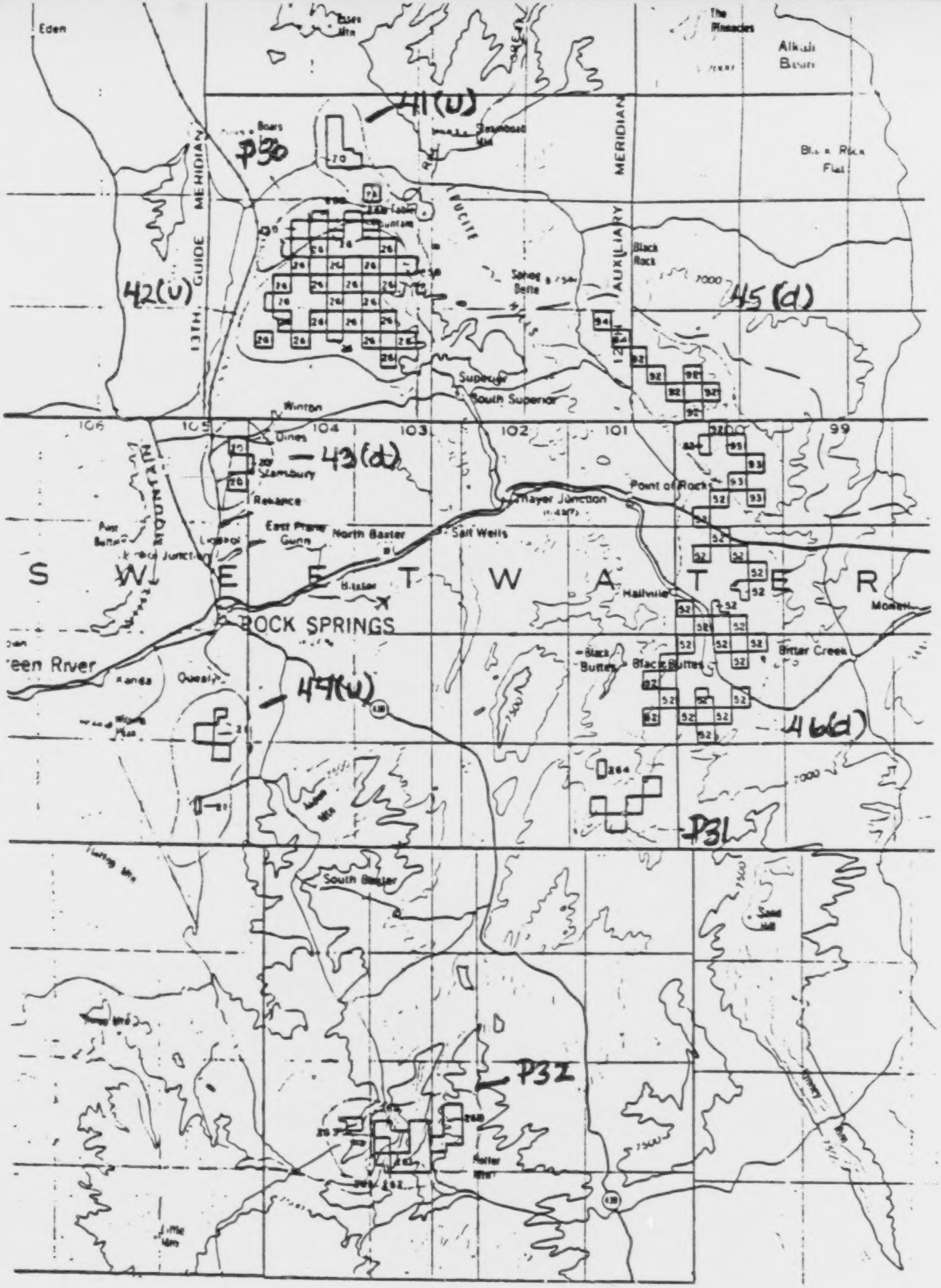
MAP 1.8 - LEASES AND PRLA'S: CONVERSE COUNTY



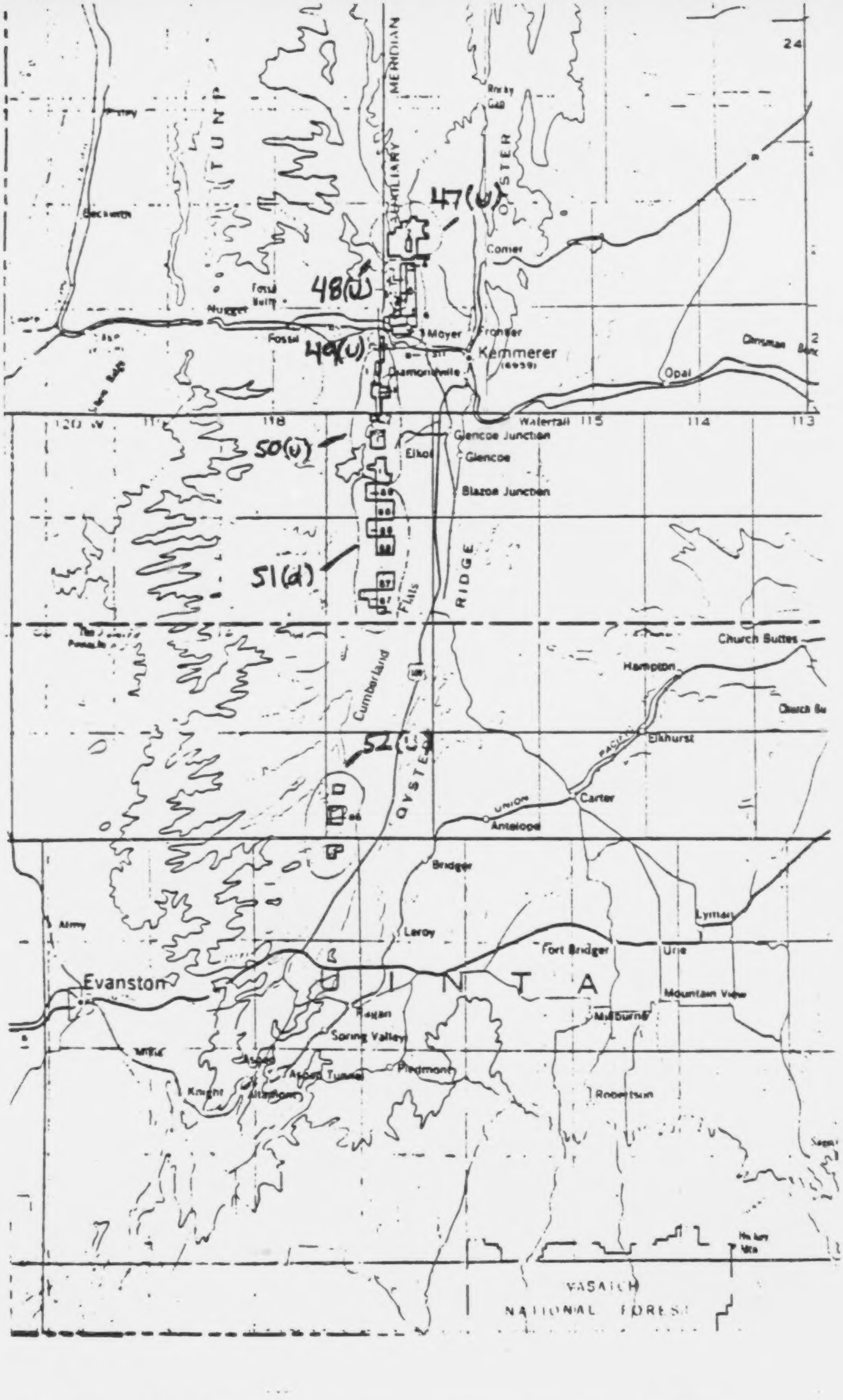
MAP 2.1 - LEASES: HANNA BASIN, CARBON COUNTY



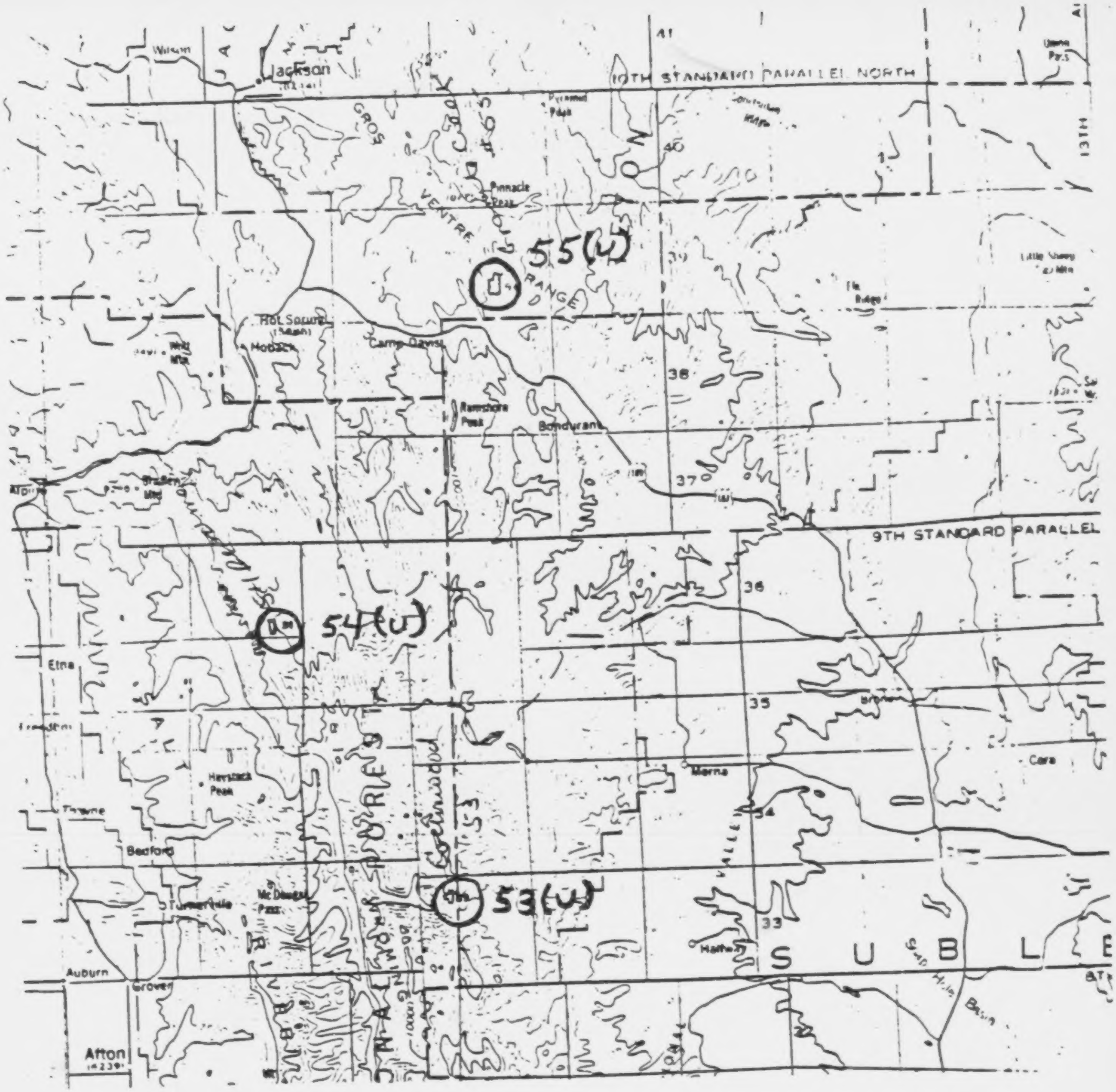
MAP 2.2 - LEASES AND PRLA'S: SOUTHWESTERN CARBON COUNTY



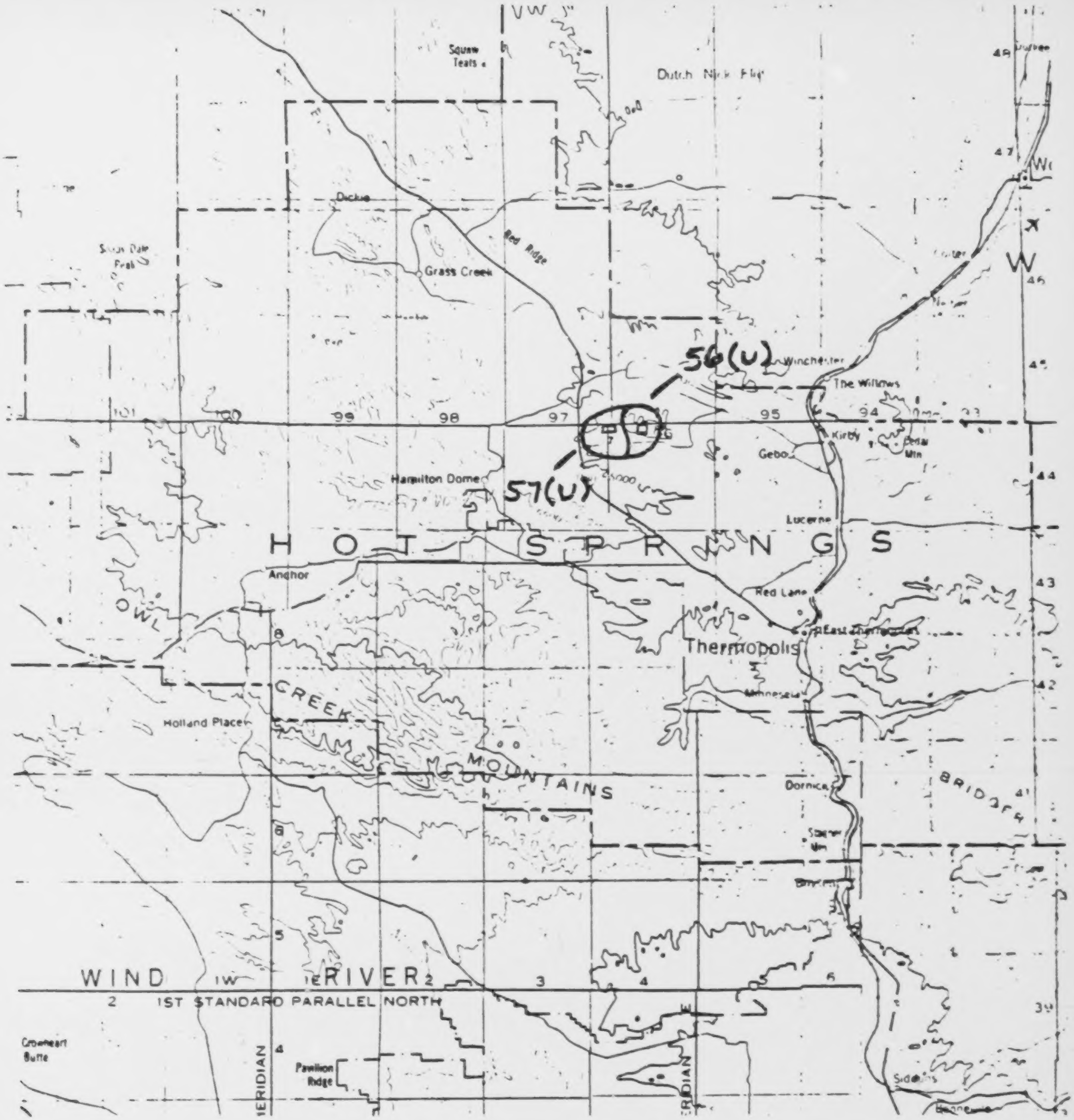
MAP 3.1 - LEASES AND PRLA'S: ROCK SPRINGS AREA, SWEETWATER COUNTY



MAP 3.2 - LEASES: KEMMERER AREA, LINCOLN AND UINTA COUNTIES



MAP 3.3 - LEASES: NORTHERN HAMS FORK REGION, SUBLETTE AND LINCOLN COUNTY, TETON COUNTY



MAP 3.4 - LEASES: BIGHORN BASIN, HOT SPRINGS COUNTY

APPENDIX 2: LEASE AND PREFERENCE RIGHT LEASE APPLICATION BLOCK DATA

A Word About the Lease Block Key

Key to Filling Out the Lease Block Summary Sheets

Use of Screens to Evaluate Development and Production Prospects

Sources of Data for Lease Blocks

Table A.2.1 - Summary of Undeveloped Lease Block Screening: Powder River Basin

Table A.2.2 - Summary of Undeveloped Lease Block Screening: Southern Wyoming

Table A.2.3 - Summary of PRLA Screening: Powder River Basin

Table A.2.4 - Summary of PRLA Screening: Southern Wyoming

Undeveloped Lease Block Summary Sheets

PRLA Block Summary Sheets

This appendix includes the key that was used for filling out summary sheets for undeveloped lease and PRLA blocks in Wyoming. Summary sheets were initially filled out by OTA for review by the Wyoming Task Force. These summary sheets have been revised to incorporate additional information provided by Task Force review and discussion. Where preliminary OTA judgments concerning development and production potential were changed by the Task Force, this is noted on the summary sheet. Task Force judgments on undeveloped leases with favorable development prospects were further evaluated by the OTA contractor responsible for evaluating developed leases (Schmidt, Porte and Silverman, 1980) through contacts with leaseholders and evaluation of production potential based on low and high production scenarios. The results of this follow-up are included in the summary sheets, and where contractor judgments differ from the Task Force, this is noted.

A Word About the Lease Block Key

The attached key to the summary sheets is presented in a question and answer format to facilitate filling out of lease block summary sheets. Questions for the primary screens are formulated such that a "yes" answer is favorable and a "no" answer unfavorable. Questions for secondary screens are stated such that a "yes" or "no" answer may be either favorable or unfavorable depending on the question. A "plus" or "minus" by the answers for each question indicates how the summary sheet should be filled out for that question. A copy of a lease/PRLA Summary Sheet is shown below that relates questions in the key on the following pages to columns on the sheet.

APPLICATION OF SCREENS

	Primary Screens								Secondary Screens						PRLAs		
						Seam	Overburden		(+ favorable - unfavorable)								
	LMU	Res.	Btu	S	Ash	Thick.	Thick.	Ratio	Own.	Act.	Tran.	Geo.	Env.	Leg.	Clms.	LMU.	Irr.
Question Number in Key	1	2	3	3	3	4	4	4	1a	1b	2	3	4	5	6	7	8

Development Prospects: __________ If favorable, suitable for _____ steam (export)
_____steam (on-site) _____synthetic fuels (on-site)

Production Prospects 1986: 1991: 1994:
(PRLAs)

COMMENTS:

Note: End use suitability (export, steam on-site and synthetic fuels on-site) are filled in only if the lease has favorable development prospects.

KEY TO FILLING OUT LEASE BLOCK SUMMARY SHEETS

Primary Screens (for evaluating the development potential of tract)

1. Does the lease tract form a compact and contiguous unit, or if individual leases in the tract do not share any boundaries, are they separated by fee or state coal that can be presumed to be part of a viable mining unit? + yes - no (Note: If the block does not meet the reserve criteria it is not considered an LMU, even if it is compact and contiguous, unless it is a PRLA and answer to question 7 of secondary screens is "yes".

2. Does the tract have sufficient recoverable reserves to support a surface mine with production capacity of 1 million tons/year of steam coal for 30 years (30 million tons) or, if the tract does not meet steam export coal quality criteria, are reserves sufficient to supply a 1000 MW mine mouth power plant at a rate of 4 million tons/year for 30 years (120 million tons) or a synthetic fuels plant at a rate of rate of 5 million tons/year for 30 years (120 million tons)? + yes - no

3. Does the coal in the tract meet the following coal quality standards? (Values on an as received basis) and unless otherwise indicated, criteria applies to both the Powder River Basin and Southern Wyoming):

End Use	Reserves (10^6 tons)	Btu/lb	(lbs/10^6 Btu)	Ash (%)	
Steam coal (export)	>30	>8,000	<.63 (1970 NSPS) <1.0 (1979 NSPS)	<10 (Powder River Basin) <12 (Southern Wyoming)	+ yes - no
Steam coal (on-site)	>120	<8,000 acceptable	<2.0	>10 Acceptable	+ yes - no
Synthetic fuels (on-site)	>180	"	<2.0	>10 Acceptable	+ yes - no

4. Do the geologic characteristics of the coal reserves or topographic conditions impose any unusual restrictions on mine design or coal recovery, and are the following seam thickness and overburden requirements met?:

End Use	Seam Thickness	Average Overburden	Stripping Ratio	
Steam coal (export)	>20 ft. >15 (surface mines, Southern Wyoming) >5 (underground mines, Southern Wyoming)	<150 ft. (Powder River Basin)	<2.3 (Powder River Basin)	+ yes - no
On-Site Conversion	>20 ft. (Powder River Basin) >15 ft (Southern Wyoming)	<175 (Powder River Basin)	<3.3 (Powder River Basin)	+ yes - no

Secondary Screens (for evaluating the potential for production from tracts by 1986 or 1991).

1. Ownership Factors

   a. Does the lessee have the coal mining experience and financial capability to develop the lease (minimum capital requirements of $15 to $20 million for a surface mine producing at a rate of 1 million typ)? _+_ yes _-_ no

   b. Is there evidence of significant exploration development work or baseline environmental studies at the site? _+_ _-_ no

2. Transportation Factors. Is the tract near (within 20 miles) of existing or proposed rail lines? _+_ yes _-_ no

3. Geotechnical Factors. Are there any special geologic, geographic, or engineering conditions relating to the tract that might adversely affect development potential? _-_ yes _+_ no

4. Environmental Factors. Are there any known environmental problems at the site? _-_ yes _+_ no

5. Legal/Institutional Factors. Are there any known legal or institutional problems that might constrain development? _-_ yes _+_ no

Additional Secondary Screens for Preference Right Lease Applications (PRLAs)

6. Are areas claimed under the 1872 mining law are present in the PRLA? _-_ yes _+_ no

   (Note: If there are just a few claims on a PRLA, this was not considered a serious impediment to issuance. A large number of claims on a PRLA was considered an impediment to issuance, but OTA did not attempt to make precise determination of location and areas of a PRLA that were covered by claims.)

7. If the PRLA block does not meet the reserve criteria, is it associated with an existing developed or undeveloped federal lease with which it could be combined to form an LMU, or with significant areas of fee or state coal? _+_ yes _-_ no

8. Is there any evidence procedures with respect to issuance of the permit, or demonstration of commercial quantities within the terms of the permit or other procedures had not been properly followed? _-_ yes _+_ no

Use of Screens to Evaluate Development and Production Prospects

Undeveloped Leases. If the block passed all of the primary screens it was judged to have favorable development prospects. Blocks that did not pass all the screens were judged to have unfavorable development prospects unless there was clear evidence that the leaseholder was actively trying to develop the lease. Judgments concerning production prospects were made as a result of weighing any favorable and unfavorable secondary site specific factors affecting the lease in the context of regional markets and due diligence requirements. Where production was contingent on certain conditions, judgments of favorable production prospects specify these conditions.

PRLA Blocks. Judgments concerning development potential of PRLA blocks were applied in a similar manner as with undeveloped leases, except that PRLAs with mining claims or evidence of procedural irregularities were rated to have uncertain development prospects even if they passed all the primary screens because of uncertainty whether the PRLA would be issued or not. PRLAs with small reserves contiguous to existing developed leases (or undeveloped leases with favorable production prospects) and no known impediments to lease issuance were judged to have favorable development prospects and favorable production prospects contingent on integration into the existing LMU. PRLAs in the just cited situation with possible impediments to lease issuance (i.e., mining claims or procedural irregularities) were given uncertain development prospects and uncertain production prospects with a note that production prospects are favorable if the lease is issued and integrated into an existing LMU. Certain PRLA blocks had unfavorable development and production prospects for surface mining, but might possibly be developed for in situ gasification. These blocks were given uncertain development prospects (contingent on in situ gasification), but unfavorable production prospects because in situ gasification is not far enough advanced as a technology to consider underground reserves as "commercial quantities" of coal for the purpose of granting preference right leases.

Sources of Data for Lease Blocks

OTA made preliminary judgments concerning development and production potential of each lease block. These preliminary judgments were reviewed by the Wyoming Task Force, and modified where appropriate. Before the screens were applied to the undeveloped leases, lease block summary sheets were filled out with the data and information needed to apply the screens. Sources of information used in preparing these summary sheets include:

1. BLM's Automated Coal Lease Data System (ACLDS) printout on coal reserves and quality, and data from industry submissions on leases under General Mining Order No. 1 of the U.S. Geological Survey.

2. Published information on reserves and quality.

3. Data from regional and site specific environmental impact statements covering the Powder River Basin and southern Wyoming.

4. Interviews with federal and state officials and other individuals in Wyoming knowledgeable about coal developments.

5. Unpublished data from BLM and USGS offices in Wyoming.

6. Examination of 7.5' topographic maps and, for the Gillette area, of USGS CRO/CDP maps.

7. A computer search conducted by the Wyoming Natural Heritage Program of all townships in Wyoming in which coal leases are located to identify rare and endangered species, plant communities and aquatic habitats.

8. Data from the Fish and Wildlife Service on potential alluvial valley floors on coal leases and PRLAs in the Gillette and Highlight Review Areas (this was a new use of the data entered into the USFWS Rapid Assessment Methodology System to update the Eastern Powder River Basin Management Framework Plan). See Appendix 6 of this volume.

9. Identification of critical large game winter ranges and migration routes and critical upland game bird habitat, using overlays on BLM's 1:1,000,000 scale map of Wyoming coal leases and PRLAs prepared by the Wyoming Game and Fish Department.

10. Additional information provided during the course of Task Force review of individual lease blocks.

11. Additional information gathered after the Task Force in follow-up contacts with leaseholders.

TABLE A.2.1 - SUMMARY OF UNDEVELOPED LEASE BLOCK SCREENING: POWDER RIVER BASIN

n.d. = no data
-- = unfavorable
? = uncertain
+ = favorable

() = changes due to OTA follow-up after Wyoming Task Force

Block #	Block Name	TYPE OF RESERVE	IS BLOCK A VIABLE MINING UNIT?	MEETS RESERVE CRITERIA?	MEETS BTU CRITERIA?	MEETS SULFUR CRITERIA?	MEETS ASH CRITERIA?	MEETS THICKNESS CRITERIA?	MEETS STRIP RATIO CRITERIA?	End Use			DEVELOPMENT PROSPECTS	1986 PRODUCTION PROSPECTS	1991 PRODUCTION PROSPECTS	Comments
										EXPORT?	ON-SITE POWER?	ON-SITE SYNFUEL?				
1	Armstrong	S	no	no	no	no	n.d.	yes	n.d.				--*	--	--	Development contingent on in situ gasification
2	Bass Trust	S	yes	yes	yes	no	yes	no	no				-- (?)	--	--	" " "
3	Gulf(1) (Arvada)	S	no	no	yes	no	yes	no	n.d.				-- (?)	--	--	" " "
4	Gulf(2) (Arvada)	S	no	no	no	no	yes	no	no				-- (?)	--	--	
5	Lake DeSmet	S	yes	yes	yes	?	yes	yes	n.d.	no	yes	yes	+	-	? (-)	Production contingent on synfuel development
6	Belco	S	yes	yes	yes	no	yes	yes	no				-- (?)*	--	--	Development contingent on in situ gasification
7	Wildcat	S	no	yes	yes	yes	yes	yes	yes	no	yes	no	+	? (-)	+ (?)	Task Force did not consider production contingent on on-site development.
8	Blue Diamond	S	no	no	yes	n.d.	n.d.	yes	yes				?	--	--	Might be developed in association with Consol(3) PRLA
12	Dry Fork	S	yes	yes	yes	yes	yes	yes	yes	yes	yes	yes	+	?	+ (?)	
13	South Rawhide	S	yes	yes	yes	yes	yes	yes	yes	?	yes	yes	+	+	+	
14	E. Gillette Federal	S	yes	yes	yes	yes	yes	yes	yes	yes	yes	yes	+	+ (?)	+ (?)	
16	Gulf(3)	S	no	no	no	no	no	no	n.d.				--*	--	--	Could possibly support a synfuels plant post 1990.
17	Peabody(1)(E.Wyodak)	S	yes	yes	yes	no	no	yes	no	no	yes	yes	-- (?)	--	--	
26	North Rochelle	S	yes	yes	yes	yes	yes	yes	yes	?	yes	yes	+	?	+	Does not meet strip ratio criteria for export.
27	Rochelle	S	yes	yes	yes	yes	yes	yes	yes	yes	yes	yes	+	? (-)	+	
28	North Antelope	S	yes	yes	yes	yes	yes	yes	yes	yes	no	no	+	+	+	
29	Antelope	S	yes	yes	yes	yes	yes	yes	n.d.	yes	yes	yes	+	+	+	
30	Phillips Creek(1)	S	no	no	no	yes	no	no	n.d.				-- (?)	--	-- (?)	Could be developed if integrated into Dave Johnston LMU (assigned to PP&L in early 1981).
31	Phillips Creek(2)	S	no	no	no	yes	no	no	n.d.				--	--	--	

*May be exchanged under P.L. 95-554

TABLE A.2.2 - SUMMARY OF UNDEVELOPED LEASE BLOCK SCREENING: SOUTHERN WYOMING

n.d. = no data
n.a. = not applicable
-- = unfavorable
? = uncertain
+ = favorable

() = Changes due to OTA follow-up after Wyoming Task Force

Block #	Block Name	TYPE OF RESERVE	IS BLOCK A VIABLE MINING UNIT?	MEETS RESERVE CRITERIA?	MEETS BTU CRITERIA?	MEETS SULFUR CRITERIA?	MEETS ASH CRITERIA?	MEETS THICKNESS CRITERIA?	MEETS STRIP RATIO CRITERIA?	End Use			DEVELOPMENT PROSPECTS	1986 PRODUCTION PROSPECTS	1991 PRODUCTION PROSPECTS	Comments
										EXPORT?	ON-SITE POWER?	ON-SITE SYNFUEL?				
36	Hanna South	S	no	no	yes	no	no	yes	n.d.	yes	no	no	+	?(+)	?(+)	Favorable due to special circumstances. Will be mined with equipment from Seminoe No. 2 mine and blended with higher quality coal.
40	Cherokee	S	yes	yes	yes	no	yes	yes	n.d.	no	yes	yes	+	--	?	Sulfur content is high, development contingent on onsite synfuel development.
41	Peabody(2)	S	no	no	yes	?	?	no	n.d.				--	--	--	
42	Long Canyon	S/U	yes	yes	yes	yes	yes	yes	n.d.	yes	?	?	+	?(+)	+	
44	Rainbow No. 8	U	no	no	yes	yes	yes	yes	n.a.				--	--	--	
47	North-North Block	S	yes	?	yes	yes	yes	yes	n.d.	yes	no	no	?	--	?(--)	Development contingent on finding sufficient reserves to justify integration into North Block LMU.
48	North Block	S	yes	yes	yes	yes	yes	yes	n.d.	yes	no	no	+	+	+	Favorable production prospects are contingent on integration into North Block LMU.
49	Twin Creek	S	yes	yes	yes	yes	yes	yes	n.d.	yes	no	no	+	+(--)	+	
52	South Haystack	S	yes	yes	yes	yes	yes	n.d.	n.a.	yes	no	no	+	+	+	
53	Cottonwood	U	no	no	yes	yes	yes	yes	n.a.				--	--	--	
54	Deadman	U	no	no	yes	yes	yes	yes	n.a.				--	--	--	
55	Granite Creek	U	no	no	n.d.	n.d.	n.d.	no	n.a.				--	--	--	
56	Kowlok	U	no	no	n.d,	n.d.	n.d.	yes	n.a.				--	--	--	
57	Western Nuclear	S/U	no	no	yes	yes	?	yes	n.d.				--	--	--	

TABLE A.2.3 - SUMMARY OF PRLA SCREENING: POWDER RIVER BASIN

n.d. = no data
-- = unfavorable
? = uncertain
+ = favorable

() = Changes due to OTA follow-up after Wyoming Task Force

Block #	Block Name	TYPE OF RESERVE	IS BLOCK A VIABLE MINING UNIT?	MEETS RESERVE CRITERIA?	MEETS BTU CRITERIA?	MEETS SULFUR CRITERIA?	MEETS ASH CRITERIA?	MEETS THICKNESS CRITERIA?	MEETS STRIP RATIO CRITERIA?	CLAIMED AREAS?	ADJACENT TO EXISTING LEASE?	PROCEDURAL IRREGULARITIES?	DEVELOPMENT PROSPECTS	1994 PRODUCTION PROSPECTS	Comments
P1	Woodson	S	?	no	yes	yes	yes	yes	no	no	no	no	--	--	Block could probably support on-site synfuels plant if combined with adjacent state leases held by Carter
P2	Thunderbird	S	yes	yes	yes	yes	yes	no	no	no	no	no	-- (?)	--	Development contingent on in situ gasification.
P3	Wold-Jenkins(1)	--	no	nd	n.d.	n.d.	n.d.	n.d.	n.d.	no	no	no	-- (?)	--	
P4	Wold-Jenkins(2)	--	no	no	n.d.	n.d.	n.d.	n.d.	n.d.	no	no	no	-- (?)	--	
P5	Wold-Jenkins(3)	--	no	no	n.d.	n.d.	n.d.	n.d.	n.d.	no	no	no	-- (?)	--	
P6	Wold-Jenkins(4)	--	no	no	n.d.	n.d.	n.d.	n.d.	n.d.	no	no	no	-- (?)	--	
P7	Consol(1)	S	yes	yes	yes	yes	yes	yes	?	yes	no	no	?	--	Blocks do not meet coal-Btu export criteria but reserves are sufficient for onsite development
P8	Consol(2)	S	yes	yes	yes	yes	yes	yes	?	yes	no	yes	?	--	
P9	Consol(3)	S	no	no	no	yes	yes	yes	no	yes	yes	no	--	--	Does not meet Btu export criteria and reserves not sufficient for onsite development. Adjacent to Blue Diamond lease, but lease has unfavorable production prospects.
P10	Peabody(P1)	S	no	no	?	?	?	yes	n.d.	no	no	yes	--	--	
P11	Peabody(P2)	S	yes	no	n.d.	n.d.	n.d.	yes	n.d.	no	yes	no	+	+*	Favorable, if integrated into Caballo LMU.
P12	Wold-Jenkins(5)	S	yes	no	?	yes	yes	?	yes	no	yes	no	+	+*	Favorable, if integrated into Cordero LMU.
P13	Arco(1)	S	yes	no	n.d.	n.d.	n.d.	yes	n.d.	yes	yes	yes	?	?	If granted and integrated into Jacobs Ranch LMU development prospects are favorable.

TABLE A.2.3 (continued)

Block #	Block Name	TYPE OF RESERVE	IS BLOCK A VIABLE MINING UNIT?	MEETS RESERVE CRITERIA?	MEETS BTU CRITERIA?	MEETS SULFUR CRITERIA?	MEETS ASH CRITERIA?	MEETS THICKNESS CRITERIA?	MEETS STRIP RATIO CRITERIA?	CLAIMED AREAS?	ADJACENT TO EXISTING LEASE?	PROCEDURAL IRREGULARITIES?	DEVELOPMENT PROSPECTS	1994 PRODUCTION PROSPECTS	Comments
P14	Arco(2)	S	yes	no	n.d.	n.d.	n.d.	yes	n.d.	yes	yes	yes	?	?*	If issued and integrated into Black Thunder LMU, development prospects are favorable.
P15	Peabody(P3)	S	yes	yes	yes	yes	yes	yes	yes	no	yes	yes	?	?*	Development prospects favorable if issued and integrated into Rochelle LMU.
P16	North Antelope(1)	S	yes	yes	yes	yes	yes	yes	yes	no	yes	no	+	+*	Favorable, if integrated into North Antelope LMU.
P17	North Antelope(2)	S	no	no	n.d.	n.d.	n.d.	yes	n.d.	no	no	yes	-- (?)	--(?)*	Could be integrated into NERCO's Antelope mine.
P18	Peabody(P4)	S	yes	yes	yes	yes	yes	yes	no	no	no	yes	?	?	Even if issued, production prospects uncertain because of high strip ratio.
P19	Peabody(P5)	S	no	no	n.d.	n.d.	n.d.	no	n.d.	yes	no	yes	--	--	
P20	Western Fuels(1)	S	no	no	no	yes	yes	no	no	yes	no	yes	--(?)	--(?)*	Could possibly be developed in conjunction with the Dave Johnston Mine.
P21	Western Fuels(2)	S	no	no	n.d.	n.d.	n.d.	n.d.	n.d.	yes	no	yes	--	--	
P22	Dixie(1)	--	no	no	n.d.	n.d.	n.d.	n.d.	n.d.	yes	no	no	--	--	
P23	Dixie(2)	S	no	no	no	n.d.	n.d.	no	n.d.	yes	no	no	?	?	Possible plan for production to supply energy for nearby uranium milling operation.

*Production timing would depend on the mining sequence of the larger LMU. Actual production from PRLA might not occur by 1994, but diligent development requirements would be satisfied by production from the larger LMU.

TABLE A.2.4 - SUMMARY OF PRLA SCREENING; SOUTHERN WYOMING

n.d. = no data
n.a. = not applicable
-- = unfavorable
? = uncertain
+ = favorable

Block #	Block Name	TYPE OF RESERVES	IS BLOCK A VIABLE MINING UNIT?	MEETS RESERVE CRITERIA?	MEETS BTU CRITERIA?	MEETS SULFUR CRITERIA?	MEETS ASH CRITERIA?	MEETS THICKNESS CRITERIA?	MEETS STRIP RATIO CRITERIA?	CLAIMED AREAS?	ADJACENT TO EXISTING LEASE?	PROCEDURAL IRREGULARITIES?	DEVELOPMENT PROSPECTS	1994 PRODUCTION PROSPECTS	Comments
P24	Kemmerer(1)	U	no	no	n.d.	n.d.	n.d.	n.d.	n.a.	no	no	yes	--	--	
P25	Kemmerer(2)	U	no	no	n.d.	n.d.	n.d.	n.d.	n.a.	no	no	no	--	--	
P26	Kemmerer(3)	U	no	no	n.d.	n.d.	n.d.	n.d.	n.a.	no	no	yes	--	--	
P27	Kemmerer(4)	U	no	no	n.d.	n.d.	n.d.	n.d.	n.a.	no	no	yes	--	--	
P28	Kemmerer(5)	U	no	no	n.d.	n.d.	n.d.	n.d.	n.a.	no	no	yes	--	--	
P29	Kemmerer(6)	U	no	no	n.d.	n.d.	n.d.	n.d.	n.d.	yes	no	no	--	--	
P30	Rosebud	U	no	no	n.d.	n.d.	n.d.	yes	n.d.	no	yes	yes	--	--	
P31	Saltwells	--	no	no	n.d.	n.d.	n.d.	no	n.d.	no	no	yes	--	--	
P32	Bean Springs	S/U	yes	yes	n.d.	n.d.	n.d.	n.d.	n.d.	no	no	no	+	?	· Uncertain production prospects because of possible environmental conflicts and long distance from existing rail lines.

UNDEVELOPED LEASE BLOCK SUMMARY SHEET

Lease Block Name: Armstrong Map Ref. No. 1 (Map 1.1)

Owner/
Parent Co. Bighorn Coal Co./
Peter Kiewit Sons' Co.
Box 724
Sheridan, WY 82801

County: Sheridan
State: WY

Location: T57N R84W
AMS Sheet Sheridan
7.5' Quad Acme, Monarch

LEASE DATA

Lease Number	Acres	Reserves	Btu/lb.	Sulfur		Ash	Seam thick.	Overburden thick.	ratio
		M Tons		%	#M Btu	(%)	(ft.)	(ft.-ave.)	
BO 25369	80	< 30	low	high	high	-	> 20	-	-

Total/
Average Data from GMO for 3 seams within 200 feet

APPLICATION OF SCREENS

Primary Screens								Secondary Screens (+ favorable - unfavorable)						PRLAs		
					Seam	Overburden										
LMU	Res.	Btu	S	Ash	Thick.	Thick.	Ratio	Own.	Act.	Tran.	Geo.	Env.	Leg.	Clms.	LMU.	Irr.
no	no	no	no	-	yes	-	-									

Development Prospects: unfavorable If favorable, suitable for _____ steam (export)
_____ steam (on-site) _____ synthetic fuels (on-site)

Production Prospects 1986: unfavorable 1991: unfavorable

COMMENTS:

This lease is separated from the Bighorn No. 1 Mine, by unleased federal coal. Bighorn Coal Co. has applied for emergency leases for federal coal (current operation is all state and fee coal), but the application for federal coal would not connect the Armstrong lease to the LMU.

Lease contains old underground workings, and is contiguous to fee land on the east side of the lease that is probably associated with alluvial valley floor by Goose Creek. Lease itself is on uplands.

The lease has unfavorable development prospects because of small reserves, low heat content and high sulfur content. Interstate 90 crosses the lease and it is designated for possible exchange under PL 95-554. Minimal reserves, if any, would be involved in an exchange.

UNDEVELOPED LEASE BLOCK SUMMARY SHEET

Lease Block Name: Bass Trust

Map Ref. No. 2 (Map 1.2)

Owner/
Parent Co. R.D. Bass Trust Estate

County: Sheridan
State: WY

Location: T54N R77W*
AMS Sheet Sheridan, Gillett
7.5' Quad Fawn Draw, Cabin Creek SE, Arvada Arvada NE

LEASE DATA

Lease Number	Acres	Reserves	Btu/lb.	Sulfur		Ash	Seam thick.	Overburden thick.	ratio
		M Tons		%	#M Btu	(%)	(ft.)	(ft.-ave.)	
W 961	20,701	>180	7467 7387	1.57 0.64	2.10 0.86	9.97 12.10	20	- -	- >10.0

Total/
Average

Data from GMO for 2 seams within 200 feet of surface.
Data in ACLDS not accurate.

APPLICATION OF SCREENS

Primary Screens								Secondary Screens						PRLAs		
					Seam	Overburden		(+ favorable - unfavorable)								
LMU	Res.	Btu	S	Ash	Thick.	Thick.	Ratio	Own.	Act.	Tran.	Geo.	Env.	Leg.	Clms.	LMU.	Irr.
yes	yes	yes	no	yes	no	-	no									

Development Prospects: unfavorable If favorable, suitable for ______ steam (export)

OTA follow-up: Uncertain (development contingent on in-situ gasification) ______ steam (on-site) ______ synthetic fuels (on-site)

Production Prospects 1986: unfavorable 1991: unfavorable

COMMENTS:

The lease is divided into two separate blocks by the Powder River, and these blocks are generally separated by one to two miles of unleased federal coal. Much of the area separating the two blocks is probably alluvial valley floor, and the western block is probably bounded by alluvial valley floor along Clear Creek. The lease is large enough that it might be divided into two LMUs. Block has unfavorable development prospects due primarily to low heat content, high sulfur content, thin seams and high strip ratio. Lease holder does not own the surface.

This lease is the largest federal coal lease ever issued and was acquired by Richard J. Blass in 1967. The main value of the lease appears to have been its use as collateral for large loans obtained by Bass for other business ventures (Cannon and Stevenson, 1980).

Note: map of this lease in BLM state office coal lease book is not accurate.

The block has some potential for in-situ gasification if this process should prove commercially feasible, but this is unlikely before 1991. See also text of OTA follow-up for the Gulf (2) block.

UNDEVELOPED LEASE BLOCK SUMMARY SHEET

Lease Block Name: Gulf (1) (Arvada Block) Map Ref. No. 3 (Map 1.2)

Owner/ Parent Co. Gulf Oil Corp.

County: Sheridan

State: WY

Location: T55N R77W

AMS Sheet Sheridan

7.5' Quad Cabin Creek SE

LEASE DATA

Lease Number	Acres	Reserves	Btu/lb.	Sulfur		Ash	Seam thick.	Overburden thick.	ratio
		M Tons		%	#M Btu	(%)	(ft.)	(ft.-ave.)	
WO 236507	195	< 30	7500 ±	high	high	-	< 20	-	> 10

Total/ Average

Heat content estimated by Task Force. Other data from GMO. Coal quality data in ACLDS not accurate.

APPLICATION OF SCREENS

Primary Screens								Secondary Screens (+ favorable - unfavorable)						PRLAs		
						Overburden										
LMU	Res.	Btu	S	Ash	Seam Thick.	Thick.	Ratio	Own.	Act.	Tran.	Geo.	Env.	Leg.	Clms.	LMU.	Irr.
no	no	yes	no	yes	no	-	-									

Development Prospects: unfavorable If favorable, suitable for ____ steam (export)

OTA follow-up: Uncertain (development contingent on in-situ gasification) ____ steam (on-site) ____ synthetic fuels (on-site)

Production Prospects 1986: unfavorable 1991: unfavorable

COMMENTS:

Small size and small reserves are the main reasons for unfavorable development prospects. The lease is adjacent to the west block of the Bass Trust lease, and there is a possibility that it might be integrated into that LMU if the Bass Trust lease had more favorable development prospects. However, Gulf's lease does not meet the sulfur or seam thickness criteria either.

The lease itself is on the uplands, but just to the east there is probably alluvial valley floor along the Powder River.

See text on OTA follow-up for Gulf (2).

UNDEVELOPED LEASE BLOCK SUMMARY SHEET

Lease Block Name: Gulf (2) (Arvada Block)   Map Ref. No. 4 (Map 1.2)

Owner/
Parent Co. Gulf Oil Corp.

County: Sheridan
State: WY

Location: T54N R77W
AMS Sheet Gillette
7.5' Quad Arvada NE

LEASE DATA

Lease Number	Acres	Reserves	Btu/lb.	Sulfur		Ash	Seam thick.	Overburden thick.	ratio
		M Tons		%	#M Btu	(%)	(ft.)	(ft.-ave.)	
WO 236621	2551	>30						-	-
WO 240559	1620		7236	1.7	2.3	8.5	<20		

Total/
Average 4171   Data from GMO. Coal quality data in ACLDS not accurate

APPLICATION OF SCREENS

Primary Screens								Secondary Screens (+ favorable - unfavorable)						PRLAs		
					Seam	Overburden										
LMU	Res.	Btu	S	Ash	Thick.	Thick.	Ratio	Own.	Act.	Tran.	Geo.	Env.	Leg.	Clms.	LMU.	Irr
no	no	no	no	yes	no	-	no									

Development Prospects: unfavorable   If favorable, suitable for _____ steam (export)
OTA Follow-up: Uncertain (developed contingent on in situ gasification)   _____ steam (on-site) _____ synthetic fuels (on-site)
Production Prospects 1986: unfavorable   1991: unfavorable

COMMENTS:

These two leases are contiguous, but since lease WO 236621 is separated into 2 blocks by 1.5 miles of unleased federal coal, the block of leases is not judged to be an LMU. The main south block also contains a few 40 acre windows of unleased federal coal. The block does not meet reserve criteria because of low heat content. Block also has unfavorable development prospects due to high sulfur content, thin seams and high strip ratio.

Gulf has indicated to BLM that the company would like to exchange these leases because of alluvial valley floors. A check with topographic maps indicates that most of the lease block is on uplands. A small part of the west end may cover alluvial valley floor along the Powder River, and the alluvial valley of the intermittent Wild Horse Creek runs through the center of the block.

OTA follow-up from Schmidt, Porte and Silverman (1980):

Gulf Oil does not consider the block commercially minable, but feels there is potential for in-situ gasification. However, no applications have been made to the Department of Energy for pilot plant development. Other options identified by the company are alteration of lease block boundaries to consolidate holdings. Unleased "windows" of federal coal are found within the lease block and consolidation could increase the ease of gasification development. The company would also consider trading the property for coal reserves elsewhere. Another option for the Arvada leases is consolidation with the R.D. Bass Trust lease block (W-961). The U.S. Geological Survey considers that gasification is the only option for that lease as well. Gulf Oil and R.D. Bass Trust have had conversations about consolidation, however, Gulf Oil would not give any indication of the results of these talks.

Gulf (2) (Arvada Block) continued

Wild Horse Creek and its North Prong both cross the main portion of the Gulf Oil leases. Powder River flows near the Gulf leases and between the east and west halves of the Bass Trust leases. Clear Creek flows along the western edge of the Bass Trust leases. Each of the streams would be subject to careful review for alluvial valley floor status.

Since neither Gulf Oil or Bass Trust has filed for federal government assistance in development of a gasification project and since no commercial market is expected for synthetic gas through 1991, these leases are expected to remain undeveloped through that time. Gulf Oil indicates that it does not intend to relinquish its leases despite the lack of development plans.

UNDEVELOPED LEASE BLOCK SUMMARY SHEET

Lease Block Name: Lake DeSmet

Map Ref. No. 5 (Map 1.4)

Owner/
Parent Co. Texaco, Inc.
Wyoming Division
Story, WY 83842

County: Johnson
State: WY

Location: T52N R82W+
AMS Sheet Sheridan
7.5' Quad Banner, Horse H
Lake DeSmet E &

LEASE DATA

Lease Number	Acres	Reserves M Tons	Btu/lb.	Sulfur %	Sulfur #M Btu	Ash (%)	Seam thick. (ft.)	Overburden thick. (ft.-ave.)	Overburden ratio
WO 30009	1913	-	-	-	-	-	-		
WO 321120	4821	-	-	-	-	-	-		
WO 30052	2203	-	-	-	-	-	-		
WO 46349	160	-	-	-	-	-	< 20		
WO 51959	320	-	-	-	-	-	<20		
Total/ Average	9417	>180	6500-7500	-	-	12-30	up to 220		

ACLDS data spotty, GMO data not available. Heat content estimated by Task Force. Ash and thickness data from BLM (1979a). See also next p

APPLICATION OF SCREENS

Primary Screens								Secondary Screens (+ favorable - unfavorable)						PRLAs		
LMU	Res.	Btu	S	Ash	Seam Thick.	Overburden Thick.	Overburden Ratio	Own.	Act.	Tran.	Geo.	Env.	Leg.	Clms.	LMU.	Irr
yes	yes	yes	?	yes	yes	-	-	+	-	na	-	-	-			

Development Prospects: favorable If favorable, suitable for no steam (export)
yes steam (on-site) yes synthetic fuels (on-site)

Production Prospects 1986: Unfavorable 1991: Uncertain, contingent on synfuel development

OTA follow-up: Unfavorable

COMMENTS:

The Lake DeSmet Block includes large acreages of non-federal coal (about 50% of federal and 50% state and fee), and Texaco owns 32,140 acres of surface in the area. Texaco controls an estimated 2-3 billion tons (BLM 1979) of coal. Total recoverable reserves (federal and non-federal) are probably on the order of 1 billion tons. ACLDS data on coal quality for thes leases is virtually nonexistent. The reserves could easily support a 20 million t/yr mine, and possibly twice that. The low heat and high ash content dictate that the block should be developed for on site conversion, and the availability of about 50,000 acre-feet of water a year from Lake DeSmet for coal conversion facilities makes such development feasible.

Production prospects for 1986 are judged unfavorable primarily because there is a lack of evidence of aggressive action to develop the site (in contrast to other synfuels proposals in the region). Some drilling was done in 1979, and a few baseline studies are underway. However, neither BLM nor the Air Quality or Land Quality Divisions of the Department of Environmental Quality have received any recent indication of development activity. Texaco did not receive funding from DOE for a synfuel feasibility study in the first or second round grants. The Task Force felt that development on an on-site power plant would be contingent on synfuel development.

Production prospects for 1991 are judged uncertain because strong local opposition to extensive on-site development, can be expected. In addition, the relative poor quality of the coal may promote development of other reserves for synfuels first. An estimated 400 million tons of reserves could be affected by alluvial valley floor (BLM 1979). The southeast part of the block contains areas of critical upland game bird habitat. Two rare plant species occur in the vicinity of the block: Brownish Sedge (Carex Brunnescens) has been found just north of the block, and European Lady Slipper (Cypripedium Calceolus) has been found near Shell Creek, five miles to the west of the block (Wyoming Natural Heritage Program 1980).

UNDEVELOPED LEASE BLOCK SUMMARY SHEET

Lease Block Name: Belco

Map Ref. No. 6 (Map 1.4)

Owner/ Parent Co. Belco Petroleum

County: Johnson

State: WY

Location: T50N R81W

AMS Sheet Sheridan

7.5' Quad Buffalo NE & SE

LEASE DATA

Lease Number	Acres	Reserves M Tons	Btu/lb.	Sulfur %	Sulfur #M Btu	Ash (%)	Seam thick. (ft.)	Overburden thick. (ft.-ave.)	Overburden ratio
WO 322794	4551	>180	7157	2.0	2.8	11.4	> 20		> 5.0

Total/ Average Data from GMO. No coal quality data in ACLDS.

APPLICATION OF SCREENS

Primary Screens LMU	Res.	Btu	S	Ash	Seam Thick.	Overburden Thick.	Overburden Ratio	Secondary Screens (+ favorable - unfavorable) Own.	Act.	Tran.	Geo.	Env.	Leg.	PRLAs Clms.	LMU.	Irr.
yes	yes	yes	no	yes	yes	-	no									

Development Prospects: unfavorable If favorable, suitable for ____ steam (export) ____ steam (on-site) ____ synthetic fuels (on-site)

OTA follow-up: Uncertain (development contingent on in-situ gasification)

Production Prospects 1986: Unfavorable 1991: Unfavorable

COMMENTS:

Lease has sufficient reserves for an on-site power or synthetic fuels plant but development prospects are unfavorable due to high sulfur content and high strip ratio.

Production prospects by 1986 are unfavorable because there is no evidence of activities to develop the lease. There has been some drilling activity since November of 1979, but no federal or state agencies have received indications of development plans. No specific proposals to develop the lease have ever been made. Interstate 90 crosses part of the lease and it is designated for possible exchange under PL 95-554.

OTA follow-up from Schmidt, Porte and Silverman, 1980).

This lease in Johnson County, WY, is the subject of negotiation with the Casper Office of BLM for land exchange or bidding credits in future lease sales. After a slow start, negotiations are now proceeding although BLM has not received a formal proposal from Belco Petroleum. Belco is interested in a tract of land north of Gillette, WY, or future bidding credits. Belco is represented in the negotiated with BLM by Mr. Arnold Cunningham of Arnex Corporation, Denver, Colorado (303-773-3588).

There is no anticipated production from this lease by 1986 or 1991. Problems related to future production based on a small amount of current information are as follows:

1. Cumulative stripping ratio to reach the best quality coals is high (greater than 3.5) and about one-half the total production will be low-quality coal.

Belco continued

2. The deposit is possibly amenable to underground mining but more likely to in-situ gasification. Belco Petroleum has not applied to the Department of Energy for pilot plant funding.

3. Interstate 90 crosses the southern part of the lease.

4. Very little exploration/development work has been performed to date. Baseline information is lacking.

Since Belco Petroleum has indicated to the BLM that the entire tract will be traded, no production should be expected from the tract.

UNDEVELOPED LEASE BLOCK SUMMARY SHEET

Lease Block Name: Wildcat

Map Ref. No. 7 (Map 1.5)

Owner/
Parent Co. Gulf Oil

County: Campbell
State: WY

Location: T52N R73W
AMS Sheet Gillette
7.5' Quad Wildcat, Calf Cre

LEASE DATA

Lease Number	Acres	Reserves		Btu/lb.	Sulfur		Ash	Seam thick.	Overburden thick.	ratio
		M Tons			%	#M Btu	(%)	(ft.)	(ft.-ave.)	
WO 220516	1571	>120	ACLDS	7478- 7873	0.5	0.63- 0.66	5.3- 7.4	> 20		2.5- 3.1
		390	USFWS						< 175	<3.5

Total/
Average

3 major seams and 2 minor seams within 200 feet of surface.
Coal quality data from GMO. ACLDS has no coal quality data.

APPLICATION OF SCREENS

Primary Screens								Secondary Screens						PRLAs		
					Seam	Overburden		(+ favorable - unfavorable)								
LMU	Res.	Btu	S	Ash	Thick.	Thick.	Ratio	Own.	Act.	Tran.	Geo.	Env.	Leg.	Clms.	LMU.	Irr.
No	Yes	Yes	Yes	Yes	Yes		Yes	+	+	+	-	?	+			

Development Prospects: favorable If favorable, suitable for no steam (export)
yes steam (on-site) yes synthetic fuels (on-site)

Production Prospects 1986: Uncertain 1991: Favorable
OTA Follow-up: Unfavorable Uncertain (low production scenario)

COMMENTS:

This lease has favorable development prospects but is a borderline case with respect to a number of criteria. It is not LMU because the lease is separated by a 1 to 2 mile wide corridor of unleased federal coal. However, reserves are probably sufficient to open a "foot in the door" mine. Gulf has proposed that the lease be modified to include unleased federal coal dividing the lease in exchange for the Gulf(3) undeveloped lease, which is authorized for exchange in PL 95-554. According to the screening criteria the lease is suitable only for onsite development because of low heat content and relatively high stripping ratios (the stripping ratios were estimated from the USGS CRO/CDP maps for the Wildcat and Calf Creek quadrangles, and these estimates are consistent with unpublished USGS data from the Casper office). Reserve data developed by USFWS (Appendix 6) indicates the the lease has sufficient reserves for an onsite synfuels plant. Several thin rider seams have even lower heat content (5781 to 6642 Btu/lb) and high sulfur contents (2.1 to 2.7 lbs/10 6 Btu). The lease has 10 acres of potential alluvial valley floor (USFWS 1980).

Production prospects for this lease are problematic. Initial judgements by OTA were unfavorable (1986) and uncertain (1991). The Task Force modified this to uncertain (1986) and favorable (1991). Gulf appears to be actively moving to develop the lease. A hundred holes have been drilled and Gulf has obtained an air quality permit from DEQ for 10 million tons/year. Baseline studies are underway at the site, and Gulf is planning to submit a mine plan to DEQ soon. Conventional economics would dictate on site conversion, but no specific proposals have been made to date.

Wildcat continued
OTA follow-up (from Schmidt, Porte and Silverman, 1980):

Development of this lease block awaits the leasing of Federal coal which presently separates lease W0220516 into two blocks. Presently, the unleased corridor is 0.5 to 0.75 miles in width. Gulf Oil plans to trade lease W25663 for this corridor, since the latter lease is crossed by Interstate 90. The modification or addition to W0220516 will be covered in the BLM environmental statement on Eastern Powder River Basin lease sales due January, 1982. The integration of the lease block can take place anytime after that date.

Gulf Oil has made no attempt to market Wildcat coal and states that it will not until the lease block is consolidated. However, the company has developed a preliminary mine plan which could be submitted to regulatory authorities soon after consolidation. Some environmental studies have also been conducted on the site including preliminary alluvial valley floor studies on Jamison Prong, which crosses the property.

Development of this lease block will be more difficult and costly than at most of the other lease blocks in Campbell County. The geology of the coal seams is very complex with a number of seams splitting in the lease block. Seven or eight different seams might be mined. Truck/shovel combinations will be needed to mine such a complex stratigraphy. The U.S. Geological Survey has tentatively concluded that the lease reserves would be most appropriate for coal conversion or on-site power generation, a conclusion consistent with OTA screening criteria.

Gulf Oil's entrance into the export coal market will be limited by the corporation's approach to mine investment and the low quality of its coal. Pittsburg and Midway Mining Co., the Gulf subsidiary which would develop the property, is extremely reluctant to capitalize a mine before developing firm markets. Since the company will not begin marketing its coal until after lease block consolidation, the overall development of the block will probably be slower than the 1986 time frame. Thus, other lease blocks in the Powder River Basin with more favorable development prospects may gain markets predicted for the Wildcat property, due to their competitive cost position in terms of mining cost and coal quality.

If Gulf Oil receives its needed coal and submits a mine permit application by 1983, production could begin by 1986. Gulf Oil would like to begin production at 3 to 5 mty and increase to 10 mty by 1990. Under the high market scenario used for analysis, production would begin in 1988 since difficulty is expected to be encountered in finding markets. Production may increase 4.2 mty by 1990. Since the market for this coal will probably be onsite power production, even these productions may be overly optimistic. Under the low market scenario, no market will exist for this coal through 1990.

UNDEVELOPED LEASE BLOCK SUMMARY SHEET

Lease Block Name: Blue Diamond

Map Ref. No. 8 (Map 1.5)

Owner/ Parent Co.
Wyodak Resources
(Black Hills Power & Light)
Box 149
Gillette, WY 57701

County: Campbell
State: WY

Location: T52N R72W
AMS Sheet Gillette
7.5' Quad Weston SW

LEASE DATA

Lease Number	Acres	Reserves	Btu/lb.	Sulfur		Ash	Seam thick.	Overburden thick.	ratio
		M Tons		%	#M Btu	(%)	(ft.)	(ft.-ave.)	
BO 37423	40	< 30	~8000	-	-	-	> 20		2.3

Total/ Average

Data from GMO. ACLDS has no coal quality data. Strip ratio estimated from GMO.

APPLICATION OF SCREENS

Primary Screens								Secondary Screens (+ favorable - unfavorable)						PRLAs		
					Seam	Overburden										
LMU	Res.	Btu	S	Ash	Thick.	Thick.	Ratio	Own.	Act.	Tran.	Geo.	Env.	Leg.	Clms.	LMU.	Irr.
no	no	yes	-	-	yes	-	yes									

Development Prospects: uncertain If favorable, suitable for ______ steam (export) ______ steam (on-site) ______ synthetic fuels (on-site)

Production Prospects 1986: Unfavorable 1991: Unfavorable

COMMENTS:

Development prospects were judged by OTA initially to be unfavorable based on small size and reserves, but the Task Force changed this to uncertain because the lease is contiguous to the Consol(3) PRLA block and could conceivably be integrated into a larger LMU. However, the Task Force judged production prospects to be unfavorable both for 1986 and 1991. The lease includes abandoned underground mine workings.

UNDEVELOPED LEASE BLOCK SUMMARY SHEET

Lease Block Name: Dry Fork (N. Gillette)
Map Ref. No. 12 (Map 1.5)

Owner/
Parent Co. Cities Service

County: Campbell
State: WY

Location: T51N R71W
AMS Sheet Gillette
7.5' Quad Gillette E

LEASE DATA

Lease Number	Acres	Reserves M Tons	Btu/lb.	Sulfur %	Sulfur #M Btu	Ash (%)	Seam thick. (ft.)	Overburden thick. (ft.-ave.)	ratio
WO 271199	640	ACLDS	8300	-	-	-	>20		
WO 271200	760		8300	-	-	-	>20		
WO 271201	2180		8300	-	-	-	>20		
		GMO	7974	0.54	0.67	7.2	>20		<2.0
Total/ Average	3580	>180							

Stripping ratio estimated from USGS CRO/CDP maps of Gillette and Gillette East quads

APPLICATION OF SCREENS

Primary Screens								Secondary Screens (+ favorable - unfavorable)						PRLAs		
LMU	Res.	Btu	S	Ash	Seam Thick.	Overburden Thick.	Overburden Ratio	Own.	Act.	Tran.	Geo.	Env.	Leg.	Clms.	LMU.	Irr.
yes	yes	yes	yes	yes	yes	-	yes	+	+	+	+	+	+			

Development Prospects: Favorable If favorable, suitable for yes steam (export) yes steam (on-site) yes synthetic fuels (on-site)

Production Prospects 1986: Uncertain 1991: Favorable
OTA Followup: Uncertain (low production scenario)

COMMENTS:

LMU includes 640 acres of state coal. This lease has favorable development prospects in all respects. GMO data indicates heat content is just below the cutoff of suitability for export, but the Western Coal Planning Assistance Project (1979) gives a heat content of 8200 Btu/lb for this mine which is closer to the ACLDS data. Sulfur data from this source is similar to the GMO data.

Peabody agreed last January to sell the reserves on this block to Cities Service for a reported 20¢/ton in place (Coal Week 10/13/80). Actual assignment was not completed until recently because of air quality permit problems. Fort Union Coal Company obtained a temporary permit that included the air quality increment that would need to be used to develop the Dry Fork block. This permit expired because the company could not demonstrate it has sufficient reserves to use the permit.

Cities Service can be expected to move as rapidly as possible to develop the lease but production prospects by 1986 are uncertain because the company does not have much of a head start on preparing a permit application. Production prospects by 1991 are favorable.
OTA follow-up (from Schmidt, Porte and Silverman, 1980):

This lease block contains 3580 acres in Campbell County, Wyoming with most of the coal reserves contained in lease W271201 in the Roland coal seam. An environmental assessment report for Wyoming DEQ is in progress and due for completion in early to mid-1981. Morrison Knudsen Company is acting as consulting engineers on the project and will finish a draft mine plan by 1981.

Dry Fork (N. Gillette) continued

There are no contracts for coal delivery from this lease block at this time. Cities Service hopes for a production of 2 mty by 1985 (steam plant contract) and 15 mty by 1990 (steam and possibly synfuel). this suggested production schedule is at the margin of possibility given the current status of information, permitting and contracting for the lease block. Cities Service has not made application to the Synthetic Fuels Board for a synfuel project on the lease.

The lease block constitutes an LMU, possibly including 640 acres of state coal. The major reclamation problem appears to be the final pit design to promote drainage from the mined and reclaimed lands and thus prevent permanent water impoundment in a closed depression. Lack of overburden may be a problem in mine design and hydrologic regime, and may possibly delay approval of a mining permit.

The lease will not meet the diligence requirement by 1986, but may do so by 1990, under the high demand scenario. The steam coal market will control the mining level through the 1980s.

No special circumstances exist for an extension of diligence requirements, except that the lessee only recently acquired the block from Peabody Coal Co., and the new owners need to complete substantial work for development. Once in compliance with diligence, the lessee will meet the continuous operation requirements.

Cities Service has also acquired Peabody Coal leases in Montana on Burlington Northern fee land. It is not clear how, or if, the company plans to develop coal production from multiple mine sites.

Cities Service Co. has a large gas bubble (excess gas) at present, and this could extend through the 1980s. Coal gasification looks less attractive under this circumstance and could delay the introduction or expansion of mining.

Under the high demand scenario of this report, the Dry Fork block is expected to produce 1.2 mty by 1986 and 9 mty by 1990. Under the low demand scenario, no development of this block will take place through 1990.

UNDEVELOPED LEASE BLOCK SUMMARY SHEET

Lease Block Name: South Rawhide   Map Ref. No. 13 (Map 1.5)

Owner/ Parent Co.:
Carter Mining Co.
(Exxon)
Box 120
Denver, CO 80201

County: Campbell
State: WY

Location: T50N R71W
AMS Sheet: Gillette
7.5' Quad: Gillette E

LEASE DATA

Lease Number	Acres	Reserves M Tons	Btu/lb.	Sulfur %	Sulfur #M Btu	Ash (%)	Seam thick. (ft.)	Overburden thick. (ft.-ave.)	ratio
W 5035	4782	> 180	7838	0.55	0.70	7.3	> 20		1.8
Total/ Average									

Data from GMO. ACLDS does not have coal quality data. Strip ratio from unpublished BLM data, and confirmed by check of USGS CRO/CDP maps.

APPLICATION OF SCREENS

Primary Screens								Secondary Screens (+ favorable - unfavorable)						PRLAs		
LMU	Res.	Btu	S	Ash	Seam Thick.	Overburden Thick.	Overburden Ratio	Own.	Act.	Tran.	Geo.	Env.	Leg.	Clms.	LMU.	Irr.
yes	yes	yes	yes	yes	yes	-	yes	+	+	+	+	-	-			

Development Prospects: favorable   If favorable, suitable for ? steam (export)
yes steam (on-site) yes synthetic fuels (on-site)

Production Prospects 1986: Favorable   1991: Favorable

COMMENTS:

This lease has favorable development prospects in all respects except that heat content appears to be a bit low for export. A mine permit application has been filed with DEQ but was declared incomplete. Efforts continue to prepare permit applications. An air permit for a maximum of 7 million t/yr has been approved by DEQ.

Interstate 90 crosses the southern part of the lease and it is designated for possible exchange under PL 95-554. Also the town of Gillette has expanded onto the surface of the southern part of the lease. Negotiations are underway for exchange of about half of the lease for unleased federal reserves to the northwest of the lease. An examination of USGS CRO/CDP maps indicates that maximum overburden thickness on the lease with stripping ratios in excess of 2.5 are in the southwest part of the lease, which is the main area proposed for exchange. According to USFWS (1980) the lease has 50 acres of potential alluvial valley floor mapped by BLM. This is the only undeveloped lease in the Gillette area that has more than minor amounts of potential alluvial valley floor.

OTA initially judged production prospects in 1986 to be uncertain due to soft coal markets and uncertainties surrounding the exchange process, but the Task Force changed this to favorable.

South Rawhide continued
OTA follow-up (from Schmidt, Porte and Silverman, 1980):

This lease block has good development prospects, with less than a 2:1 stripping ratio. The lease block is adjacent to the northeast portion of the city of Gillette. In fact, some housing development has already taken place on the lease surface. The City of Gillette has requested that Carter Mining exchange southern 2880 acres, and the company has applied to do so with the BLM. The company has indicated that the exchange is being processed. Carter Mining plans to submit a mine plan for the remaining 1920 acres in December, 1980.

The OSM has already begun its EIS preparation process and approval of a permit should be gained in early 1982. Thus production could begin in 1984. No coal at South Rawhide has been sold, however, and coal quality is lower than at Carter Mining's Rawhide and Caballo properties. Carter Mining is considering several options for the South Rawhide block, including construction of a conveyor to the Rawhide plant facilities. Construction of such a conveyor would permit blending of Rawhide and South Rawhide coal, and thus the use of some South Rawhide coal to meet existing Carter Mining contracts. In itself, South Rawhide coal meets some, but not all, of Carter Mining existing contract coal quality standards.

Carter Mining plans to submit a permit application in mid-December, 1980. Writing of an environmental statement is expected to begin early in 1981, and permit approval is expected in 1982. Carter Mining hopes to begin shipping coal by 1984. Carter Mining plans to develop production capacity of 3 mty by 1985 and 12 mty by 1990. Under the high demand scenario, it is expected that Carter Mining will begin production at a low level in 1985 and expand production to 7.2 mt in 1990. Under the low demand scenario, no new market is expected to exist for South Rawhide coal. However, in such a situation, it is expected that Carter Mining would decrease production at Rawhide and Caballo, substitute South Rawhide coal into existing contracts, and thus bring the South Rawhide block into production.

UNDEVELOPED LEASE BLOCK SUMMARY SHEET

Lease Block Name: East Gillette Federal
Map Ref. No. 14 (Map 1.5)

Owner/ Parent Co.
Kerr-McGee Coal Corp.
(Kerr-McGee Corp.)
400 S. Miller
Gillette, WY 82716

County: Campbell
State: WY

Location: T50N R71W
AMS Sheet Gillette
7.5' Quad Gillette E

LEASE DATA

Lease Number	Acres	Reserves	Btu/lb.	Sulfur		Ash	Seam thick.	Overburden thick.	ratio
		M Tons		%	#M Btu	(%)	(ft.)	(ft.-ave.)	
WO 311810	1263	GMO ACLDS	8055	0.46	0.57	5.7	> 20		
WO 312311	880		8055	0.46	0.57	5.7	> 20		
WO 313668	2299		8055	0.46	0.57	5.7	> 20		
		>180	7862- 7945	0.4- 0.5	0.51- 0.62	5.3- 6.1	> 20		
Total/ Average	4442							147	1.9

Overburden and strip ratio from unpublished BLM data

APPLICATION OF SCREENS

Primary Screens								Secondary Screens (+ favorable - unfavorable)						PRLAs		
						Overburden										
LMU	Res.	Btu	S	Ash	Seam Thick.	Thick.	Ratio	Own.	Act.	Tran.	Geo.	Env.	Leg.	Clms.	LMU.	Irr.
yes	yes	yes	yes	yes	yes	yes	yes	+	+	+	+	-	-			

Development Prospects: Favorable
If favorable, suitable for yes steam (export)
yes steam (on-site) yes synthetic fuels (on-site)

Production Prospects 1986: Favorable 1991: Favorable
OTA Followup: Uncertain Uncertain (low production scenario)

COMMENTS:

The block is associated with the currently operating Clovis Point mine (East Gillette #16) on state coal. Glass 1980 lists only specific contracts for Clovis Point. The Western Coal Planning Assistance Project (1979) lists destinations of coal from the mine to four utilities in Arkansas, Louisiana, and Oklahoma. An air quality permit has been issued for a maximum annual production of 11 million t/yr (in addition to 4 million t/yr for Clovis Point). Mine permit application was submitted several years ago, but is not currently under active review. Leases WO 312311 and 313668 are included in exchange negotiations authorized by PL 95-554. The block has 5 acres of potential alluvial valley floor (USFWS 1980

OSM indicates the block has known cultural resource "problems."

UNDEVELOPED LEASE BLOCK SUMMARY SHEET

Lease Block Name: Gulf (3) Map Ref. No. 16 (Map 1.6)

Owner/ Parent Co. Gulf Oil Corp.

County: Campbell
State: WY

Location: T49N R73W
AMS Sheet Gillette
7.5' Quad Oriva, Four Bar J Ranch

LEASE DATA

Lease Number	Acres	Reserves M Tons		Btu/lb.	Sulfur %	Sulfur #M Btu	Ash (%)	Seam thick. (ft.)	Overburden thick. (ft.-ave.)	Overburden ratio
WO 25663	756	<30	GMO ACLDS	7833	0.31	0.40	12.6	< 20		
				6050	3.2	4.6	12.3	< 20		
Total/ Average										

APPLICATION OF SCREENS

Primary Screens								Secondary Screens (+ favorable - unfavorable)						PRLAs		
LMU	Res.	Btu	S	Ash	Seam Thick.	Overburden Thick.	Overburden Ratio	Own.	Act.	Tran.	Geo.	Env.	Leg.	Clms.	LMU.	Irr.
no	no	no	no	no	no	-	-									

Development Prospects: Unfavorable If favorable, suitable for ____ steam (export) ____ steam (on-site) ____ synthetic fuels (on-site)

Production Prospects 1986: Unfavorable 1991: Unfavorable

COMMENTS:

This lease is unfavorable in all respects. Reserves are small, heat content is low, ash and sulfur are high and seams are thin. In addition, the Interstate runs through the length of the lease which would eliminate a large portion from mining due to the required buffer zone. This lease is authorized for exchange under PL 95-554 and Gulf wants to exchange reserves to fill out the Wildcat lease. It is uncertain whether the lease has any value at all for exchange.

UNDEVELOPED LEASE BLOCK SUMMARY SHEET

Lease Block Name: Peabody (1) (East Wyodak, South Gillette) Map Ref. No. 17 (Map 1.7)

Owner/
Parent Co. Peabody Coal Co.

County: Campbell
State: WY

Location: T49N R71W
AMS Sheet Gillette
7.5' Quad The Gap,
Coyote Draw

LEASE DATA

Lease Number	Acres	Reserves M Tons		Btu/lb.	Sulfur %	Sulfur #M Btu	Ash (%)	Seam thick. (ft.)	Overburden thick. (ft.-ave.)	Overburden ratio
WO 313667	2560	>30	ACLDS	8300	-	-	-	>20		
			GMO	7926	0.9	1.1	11.2	>20		

Total/
Average
Strip-ratio from unpublished BLM data. Examination of USGS CRO/CDP maps indicate average ratio is probably higher. 2.5

APPLICATION OF SCREENS

Primary Screens								Secondary Screens (+ favorable - unfavorable)						PRLAs		
						Overburden										
LMU	Res.	Btu	S	Ash	Seam Thick.	Thick.	Ratio	Own.	Act.	Tran.	Geo.	Env.	Leg.	Clms.	LMU.	Irr.
Yes	Yes	Yes	No	No	Yes	-	No									

Development Prospects: Unfavorable If favorable, suitable for no steam (export)
yes steam (on-site) yes synthetic fuels (on-site)

OTA Follow-up: Uncertain

Production Prospects 1986: Unfavorable 1991: Unfavorable

COMMENTS:

The LMU includes 640 acres of state coal. This block was originally judged by OTA to have marginally favorable development prospects, but additional data obtained from the GMO and USGS CRO/CDP maps indicate that sulfur and ash content are too high and the strip ratio is too high for the reserves on the lease. It is possible that the lease could be developed in conjunction with the Peabody (P1) PRLA block, but this seems very unlikely. There is no evidence of recent activities to promote development of the lease. The lease has 5 acres of potential alluvial valley floor (USFWS 1980).

OTA initially judged production prospects for 1991 uncertain, but this was changed by the Task Force to unfavorable. OTA follow-up after the Task Force meeting found that Peabody has no intentions of relinquishing the lease even though it has no specific development plans. As a result, development prospects were changed back to uncertain. Reserve data developed by USFWS for OTA (see Appendix 6) indicates that the lease has over 200 million tons of reserves with a stripping ratio of less than 3.5 and average overburden depth less than 175 feet, thus the lease appears to have potential for an on-site synfuels plant. However, if the lease were developed for this purpose it would probably be after 1991.

UNDEVELOPED LEASE BLOCK SUMMARY SHEET

Lease Block Name: North Rochelle (Teckla)

Map Ref. No. 26 (Map 1.7)

Owner/ Parent Co. Shell Oil

County: Campbell

State: WY

Location: T42N R70W

AMS Sheet Newcastle

7.5' Quad Reno Reservoir, Teckla, Piney Car yon NW & SW

LEASE DATA

Lease Number	Acres	Reserves		Btu/lb.	Sulfur		Ash	Seam thick.	Overburden thick.	ratio
		M Tons			%	#M Btu	(%)	(ft.)	(ft.-ave.)	
WO 321779A	2000	>180	ACLDS	8499	0.32	0.38	5.6	> 20		
			GMO	8341- 8572	0.3		5.1- 5.6	> 20	> 150	> 2.6

Total/ Average

GMO and ACLDS data taken from Rochelle lease. Strip ratio and overburden thickness estimated from information provided at the Task Force.

APPLICATION OF SCREENS

Primary Screens -								Secondary Screens (+ favorable - unfavorable)						PRLAs		
					Seam	Overburden										
LMU	Res.	Btu	S	Ash	Thick.	Thick.	Ratio	Own.	Act.	Tran.	Geo.	Env.	Leg.	Clms.	LMU.	Irr.
yes	yes	yes	yes	yes	yes	yes	yes	+	+	+	+	+	+			

Development Prospects: Favorable If favorable, suitable for ? steam (export) Yes steam (on-site) Yes synthetic fuels (on-site)

Production Prospects 1986: Uncertain 1991: Favorable

OTA Follow-up: Uncertain (low production scenario)

COMMENTS:

This lease was recently assigned to Shell from Peabody's Rochelle lease. Average overburden and strip ratio are marginal for export.

Shell is currently doing exploration drilling on the lease and is actively working on preparing a permit application, including air quality monitoring. Shell expects to have a mine permit application ready in early 1984. Production prospects by 1986 are uncertain due to marginal overburden thickness and strip ratio and the soft market for Powder River Coal. Production prospects by 1991 are favorable.

OTA follow-up (from Schmidt, Porte and Silverman, 1980):

Shell is currently doing mine feasibility and environmental studies and hopes to apply for a mining permit by 1984. None of the coal is presently sold. It appears likely that future sales will be directed to steam/electric use, at least in the near term, with gasification and possible liquefaction perhaps becoming feasible in the 1990s. The synthetic development will depend on Shell's long-term gas position, and we do not anticipate coal-to-gas conversion on this lease before 1991. The proximity of this lease to the Peabody/Panhandle Eastern venture may also inhibit synfuel development.

Diligent development requirements will not be met by 1986. The 1991 requirement can be met by steam coal market demand under the high demand scenario. Shell estimates that maximum production capacity from the lease will reach 8.0 mty, however, production of only 4.8 mty is expected by 1990 under the high scenario. No market is anticipated through 1990 under the low demand scenario.

North Rochelle (Teckla) continued

Another production scenario for the North Rochelle lease relates to Shell Oil's overall position in the Powder River Basin. Presently, Shell Oil is developing the Buckskin property, which has a contracted production of 6.2 mty. Shell Oil is also planning a large project at Young's Creek on the Crow Reservation, Montana. The ability of Buckskin to fulfill its contract obligations is in some jeopardy because of the low mineable reserve base (76 mty) and the further uncertainty to 29 mt by alluvial valley floor concerns. Unless Buckskin is able to expand its reserve base into unleased Federal coal, its mineable reserve base will be extinguished in seven to 13 years. The ability to obtain unleased coal is in doubt since Carter Mining is interested in some of the same areas in order to expand its Rawhide Mine reserve base. If Buckskin falls short on its production expectations, Shell Oil may need to bring on North Rochelle, or Young's Creek, to meet contract needs.

UNDEVELOPED LEASE BLOCK SUMMARY SHEET

Lease Block Name: Rochelle   Map Ref. No. 27 (Map 1.7)

Owner/
Parent Co. Peabody Coal Co.

County: Campbell
State: WY

Location: T41N R70W
AMS Sheet Newcastle
7.5' Quad Teckla, Piney
Canyon SW

LEASE DATA

Lease Number	Acres	Reserves M Tons	Btu/lb.	Sulfur %	Sulfur #M Btu	Ash (%)	Seam thick. (ft.)	Overburden thick. (ft.-ave.)	Overburden ratio
WO 321779B	8781	GMO ACLDS	8449	0.32	0.38	5.6	>20		
WO 37829	40		8449	0.32	0.38	5.6	>20		
			8347- 8572	0.3		5.1- 5.6	>20	<150	<2.3
Total/ Average	8821	>180							

APPLICATION OF SCREENS

Primary Screens								Secondary Screens (+ favorable - unfavorable)						PRLAs		
						Overburden										
LMU	Res.	Btu	S	Ash	Seam Thick.	Thick.	Ratio	Own.	Act.	Tran.	Geo.	Env.	Leg.	Clms.	LMU.	Irr.
yes	yes	yes	yes	yes	yes	yes	yes	+	+	+	-	-	+			

Development Prospects: Favorable   If favorable, suitable for yes steam (export)
yes steam (on-site) yes synthetic fuels (on-site)

Production Prospects 1986: Uncertain   1991: Favorable
OTA Follow-up: Uncertain (low production scenario)

COMMENTS:

Production prospects for this block have been uncertain for some time. Three or four mine permit applications have been found incomplete due to unsatisfactory mining and reclamation plans. A dragline has been at the site since 1978, and Peabody has had difficulty putting together a mining plan appropriate to the equipment because a truck and shovel operation would be more efficient. There appear to be problems with adequate fill material for final contour, and a scarcity of topsoil. Prairie dog towns on the lease provide possible habitat for Black-Footed Ferrets, and a sage grouse breeding complex is located in the middle of the lease.

500 million tons have been committed to Panhandle Eastern for its proposed gasification plant in Converse County. Panhandle Eastern has received funding from DOE for a feasibility study on the plant and if things go according to Panhandle's schedule, the plant should begin using coal by 1986. Some coal from Rochelle may go toward contract commitments for the North Antelope mine. There are enough uncertainties involved in both projects that actual production by 1986 appears uncertain. However, prospects for production by 1991 seem favorable.

OTA follow-up (from Schmidt, Porte and Silverman, 1980):

Although about 200 mt of recoverable reserves in 2000 acres were assigned to Shell Oil, this lease block still contains an estimated 770 mt of reserves. This estimate is substantially higher than Peabody Coal's own estimate. However, the company typically uses unrealistically low economic stripping limits in calculating reserves. The estimate used here adopts a mineable reserve estimate consistent with that used by Shell Oil on its newly acquired portion of the James Rochelle leases. Peabody Coal plans on using one-third of the present Rochelle reserves in the National Antelope mine. Thus, about 510 mt will be developed as the Rochelle Mine and about 260 mt will be developed as the North Antelope Mine.

Rochelle continued

Peabody has contracted 500 mt to Panhandle Eastern for its proposed gasification plant in Douglas. Panhandle Eastern's plans now call for production in 1986, using coal at a rate of about 6 mty, with an additional one to two mty for an associated steam/electric plant. The DOE has already funded a feasibility study on the Panhandle Eastern project and emissions from the proposed site of the gasification plant in Converse County should be able to meet air quality standards. In light of continued delays in development of synthetic plants, production is uncertain throughout the decade, but if any synthetic fuels plant comes on line before 1991, this project is the most likely one.

UNDEVELOPED LEASE BLOCK SUMMARY SHEET

Lease Block Name: North Antelope Map Ref. No. 28 (Map 1.7)

Owner/
Parent Co. North Antelope Coal Co.
(Peabody Coal Co. and
Panhandle Eastern)

County: Campbell
State: WY

Location: T41N R70W
AMS Sheet Newcastle
7.5' Quad Teckla - 1a

LEASE DATA

Lease Number	Acres	Reserves		Btu/lb.	Sulfur		Ash	Seam thick.	Overburden thick.	ratio
		M Tons			%	#M Btu	(%)	(ft.)	(ft.-ave.)	
W 60231	320	>30	GMO	8347- 8572	0.3	-	5.1- 5.6	>20	<150	<2.5
				8450	0.32	0.38	4.8	54		

Total/
Average GMO data same as Rochelle lease. ACLDS has no coal quality data.
Additional data from Western Coal Planning Assistance Project (1979).

APPLICATION OF SCREENS

Primary Screens								Secondary Screens (+ favorable - unfavorable)						PRLAs		
LMU	Res.	Btu	S	Ash	Seam Thick.	Overburden Thick.	Overburden Ratio	Own.	Act.	Tran.	Geo.	Env.	Leg.	Clms.	LMU.	Irr.
yes	yes	yes	yes	yes	yes	yes	yes	+	+	+	+	+	-			

Development Prospects: Favorable If favorable, suitable for yes steam (export)
no steam (on-site) no synthetic fuels (on-site)

Production Prospects 1986: Favorable 1991: Favorable

COMMENTS:

According to Glass (1980) North Antelope Coal has contractual commitments with System Fuels for 150 million tons beginning in 1985. These commitments apparently were made on the assumption that Preference Right Lease Applications W 25719 and W 32067 (P16 and P17 on map) would be issued. North Antelope also has a 640 acre state lease adjacent to the federal lease. These two leases combined probably do not have sufficient reserves to meet even half of the contractual commitment. As an alternative to the PRLAs, Peabody has committed reserves from the west part of the Rochelle lease.

DEQ recently rejected a permit application to start mining on the state lease. However, given the existence of contractual commitments, production seems likely by 1986. An air quality permit for 5 million tons/yr. has already been issued.

OTA follow-up (from Schmidt, Porte, and Silverman, 1980):

Although the recoverable reserves of lease W60231 are only 22 mt, Peabody Coal has committed about 260 mt of reserves from the Rochelle block to the North Antelope project. Coal from the mine will be shipped to Little South Utilities, a subsidiary of Systems Fuel, Inc., in Arkansas. The power plant is now expected to be on line in 1984, and production at the mine is expected to meet power plant needs.

The North Antelope permit application has already been submitted, and rejected as incomplete, by the Wyoming DEQ twice. Alluvial valley floor issues are substantial and will have to be adequately addressed by the company. Peabody Coal has also had to rearrange a planned rail spur in order to avoid disturbing an eagle's nest.

Since resubmittal of a mine permit is expected in 1981 and a firm market exists for the coal, this lease block has favorable production prospects for 1986 and is expected to meet diligent development requirements under either the high or low demand scenario.

UNDEVELOPED LEASE BLOCK SUMMARY SHEET

Lease Block Name: Antelope

Map Ref. No. 29 (Map 1.7)

Owner/
Parent Co. Nerco, Inc.
(Pacific Power & Light)

County: Converse
State: WY

Location: T41N R71W
AMS Sheet Newcastle
7.5' Quad Betty Reservoir-1

LEASE DATA

Lease Number	Acres	Reserves M Tons	Btu/lb.	Sulfur %	Sulfur #M Btu	Ash (%)	Seam thick. (ft.)	Overburden thick. (ft.-ave.)	ratio
WO 321780	2908	ACLDS	8400	0.26	0.31	6.2	20		
WO 322255	1869		8400	0.26	0.31	6.2	20		
BO 31719	40		9060	0.5	0.55	--	20		
			8650	0.2	0.23	6.0	35		
Total/ Average	4817	>180							

Data from ACLDS. Supplemental data from Western Coal Planning Assistance Project (1979). GMO does not have coal quality data.

APPLICATION OF SCREENS

Primary Screens								Secondary Screens (+ favorable - unfavorable)						PRLAs		
LMU	Res.	Btu	S	Ash	Seam Thick.	Overburden Thick.	Overburden Ratio	Own.	Act.	Tran.	Geo.	Env.	Leg.	Clms.	LMU.	Irr.
yes	yes	yes	yes	yes	yes	-	-	+	+	+	+	-	+			

Development Prospects: Favorable If favorable, suitable for yes steam (export)
yes steam (on-site) yes synthetic fuels (on-site)

Production Prospects 1986: Favorable 1991: Favorable

COMMENTS:

Block includes the old East Antelope (also called Brannon) surface mine (BO 31719) which shut down several years ago due primarily to mine safety regulations. ACLDS data for BO 31719 does not seem to be consistent with either adjacent leases or data published for East Antelope mine in EPA (1976).

NERCO has contracts with Western Fuels and the Platte River Power Authority to deliver coal from this mine in 1983 so production prospects by 1986 are favorable. DEQ expects a permit application by early October. OSM indicates the block has known cultural resource "problems."

OTA follow-up (from Schmidt, Porte and Silverman, 1980):

The Antelope Mine permit application was submitted to the OSM and Wyoming DEQ in fall, 1980. A joint OSM, U.S. Geological Survey, and U.S. Forest Service environmental statement is scheduled to begin in January, 1981, with draft publication in 1982. NERCO should have little trouble meeting its goal of production by December, 1983. Coal will be shipped to Platte River Power Authority and Systems Fuel, Inc. NERCO plans to be shipping 5.6 mty by 1990 and will have developed a capacity of 12 mty by 1993, although additional markets have not been obtained. Since all planned production through 1990 is already contracted, production prospects for 1986 and 1991 are considered favorable. The Antelope Mine will not meet diligent development requirements by 1986, however, and NERCO plans on filing for an extension. The mine plan area includes the three federal leases and two Wyoming state leases.

Antelope continued

Antelope Creek flows through the northern portion of the mine plan area. The company has concluded that portions of the valley are alluvial valley floors, and interviews with the OSM staff indicate agreement with this finding. NERCO has decided not to propose mining the valley and hopes to gain permit approval based on the finding that mining the surrounding uplands will have negligible effect on the valley. The decision not to propose mining Antelope Creek valley in part is related to NERCO's unwillingness to slow permit approval with potential complications over reclamation of an alluvial valley floor. The company also determined that it would be too costly to divert Antelope Creek flood flows. Mining of the valley may be proposed at a later time.

Initially, overburden stripping will be accomplished using one 24 cubic yard shovel or a front-end loader. A truck fleet will be gradually increased to meet the growing spoil disposal needs. When production reaches 3 mty in 1987, a second truck/shovel fleet will be added. If additional contracts are obtained after 1990 and production is increased to 8 mty, a 50 cubic yard dragline will be added. To achieve maximum production of 12 mty, a second dragline would have to be added. At any one time, one to three active pits will be developed concurrently.

UNDEVELOPED LEASE BLOCK SUMMARY SHEET

Lease Block Name: Phillips Creek (1)   Map Ref. No. 30 (Map 1.8)

Owner/ Parent Co. Sunoco Energy Dev. Co. (The Sun Co.)

County: Converse

State: WY

Location: T37N R74W

AMS Sheet Newcastle

7.5' Quad Fifth Five Ranch (15'), Highland Flats (15')

LEASE DATA

Lease Number	Acres	Reserves M Tons	Btu/lb.	Sulfur %	Sulfur #M Btu	Ash (%)	Seam thick. (ft.)	Overburden thick. (ft.-ave.)	ratio
WO 136194	322		7299	0.4	0.55	11.7	< 20		
WO 136195	1477		7299	0.4	0.55	11.7	< 20		
WO 136196	1560		7299	0.4	0.55	11.7	< 20		
WO 324701	680		7299	0.4	0.55	11.7	< 20		
Total/ Average	4039	< 30	Data from ACLDS						

APPLICATION OF SCREENS

Primary Screens								Secondary Screens (+ favorable - unfavorable)						PRLAs		
LMU	Res.	Btu	S	Ash	Seam Thick.	Overburden Thick.	Overburden Ratio	Own.	Act.	Tran.	Geo.	Env.	Leg.	Clms.	LMU.	Irr.
no	no	no	yes	no	no											

Development Prospects: Unfavorable   If favorable, suitable for ____ steam (export)

OTA Follow-up: Uncertain   ____ steam (on-site) ____ synthetic fuels (on-site)

Production Prospects 1986: Unfavorable   1991: Unfavorable

OTA Follow-up: Uncertain (development contingent on integration into Dave Johnston LMU)

COMMENTS:

Most of reserves listed in ACLDS are underground and not economically minable. Coal has low heat content, high ash content, and seams are thin. Lease WO 36194 is separated from the rest of the block by state coal leased by PP&L. DEQ has not had indications of activities to promote development of the lease. The lease is partly covered by critical upland game bird habitat.

OTA follow-up (from Schmidt, Porte and Silverman, 1980):

Sunoco Energy Development has no plans to develop this lease independently. However, negotiations are in progress with NERCO for assignment of the leases, since the block is adjacent to the Dave Johnston Mine. Neither company is willing to supply information on the success of the negotiations, so the development prospects are considered uncertain. Incorporation into the Dave Johnston mine plan would probably not lead to mining the Phillips Creek tracts until after 1991. The Dave Johnston Mine operates at a constant output of 3.7 mty, and there are no plans to increase the size of the power plant which uses all of the Dave Johnston production. NERCO has already outlived its proposed mining areas through 1996. Incorporation of the Phillips Creek leases into the Dave Johnston logical mining unit might result in achievement of diligence requirements, using the production of the operating mine.

UNDEVELOPED LEASE BLOCK SUMMARY SHEET

Lease Block Name: Phillips Creek (2) Map Ref. No. 31 (Map 1.8)

Owner/
Parent Co. Sunoco Energy Dev. Co.
(The Sun Co.)

County: Converse
State: WY

Location: T37N R75W
AMS Sheet Newcastle
7.5' Quad Fifty Five Ranch (15')

LEASE DATA

Lease Number	Acres	Reserves	Btu/lb.	Sulfur		Ash	Seam thick.	Overburden thick.	ratio
		M Tons		%	#M Btu	(%)	(ft.)	(ft.-ave.)	
WO 310712	40	<30	7299	0.40	0.55	11.7	<20		
Total/ Average									

Data from ACLDS

APPLICATION OF SCREENS

Primary Screens								Secondary Screens (+ favorable - unfavorable)						PRLAs		
						Overburden										
LMU	Res.	Btu	S	Ash	Seam Thick.	Thick.	Ratio	Own.	Act.	Tran.	Geo.	Env.	Leg.	Clms.	LMU.	Irr.
no	no	no	yes	no	no	-	-									

Development Prospects: Unfavorable If favorable, suitable for ____ steam (export)
____ steam (on-site) ____ synthetic fuels (on-site)

Production Prospects 1986: Unfavorable 1991: Unfavorable

COMMENTS:

This lease is surrounded by unleased federal coal and is located several miles north and west of Phillips Creek (1). It passes none of the primary screens except sulfur content. However, these coal quality data are identical to data given for the four leases in Phillips Creek (1).

UNDEVELOPED LEASE BLOCK SUMMARY SHEET

Lease Block Name: Hanna South
Map Ref. No. 36 (Map 2.1)

Owner/ Parent Co. Ark Land Company (Ashland Oil)

County: Carbon
State: WY

Location: T22N R84W
AMS Sheet Rawlins
7.5' Quad Hanna

LEASE DATA

Lease Number	Acres	Reserves		Btu/lb.	Sulfur		Ash	Seam thick.	Overburden thick.	ratio
		M Tons			%	#M Btu	(%)	(ft.)	(ft.-ave.)	
W 25406	640	-	ACLDS	9861- 11,460	0.40- 1.42	0.35- 1.43	4.8- 17.4	>15		
		6.1 surface reserve	EIS	9880- 10,288	0.73- 1.42	0.71- 1.43	13.8- 13.77	41.2		
Total/ Average										

ACLDS includes coal quality data for two seams that are not mentioned in the Southcentral Wyoming EIS (BLM 1979a). Seam thickness given is the total thickness of four seams proposed to be mined.

APPLICATION OF SCREENS

Primary Screens								Secondary Screens (+ favorable - unfavorable)						PRLAs		
						Overburden										
LMU	Res.	Btu	S	Ash	Seam Thick.	Thick.	Ratio	Own.	Act.	Tran.	Geo.	Env.	Leg.	Clms.	LMU.	Irr.
no	no	yes	no	no	yes			+	+	+	+	-	+			

Development Prospects: Favorable, due to special circumstances, If favorable, suitable for yes steam (export) no steam (on-site) no synthetic fuels (on-site)

Production Prospects 1986: uncertain 1991: uncertain
OTA Followup: Favorable favorable

COMMENTS:

Although development prospects would normally be judged unfavorable (relatively small reserves and relatively high sulfur and ash content), this block has favorable development prospects because of its association with the active Seminor No. 2 mine to the north. According to Glass (1980) all the reserves on this lease are committed to Iowa Public Service.

The proposed surface mine was covered as a site specific proposal in the Southcentral Wyoming EIS (1978), and baseline studies are underway as part of preparation of a mine permit application. It is notable that the coal quality data in ACLDS appears to bear little relationship to the data given in the EIS.

The mine has several potential environmental problems. The southern part of the mine includes crucial nesting area for sage grouse. Pronghorn winter range is throughout the proposed project area, but Wyoming Game and Fish Department do not show critical habitat in the area. According to DEQ, mining of coal under Standpipe Draw may create some drainage problems, and OSM indicates there are known cultural resources problems at the site.

Production prospects for 1986 and 1991 were judged by the Task Force to be uncertain due to the unfavorable characteristics of the lease.

OTA follow-up from Schmidt, Porte and Silverman, 1980):

Hanna South continued

This lease block is located south of Hanna, Wyoming and is underlain by the Hanna #1 and Bed 78 coal seams. Reserves in-place on the lease are 6.2 million tons, and the logical mining unit would contain this lease plus two adjacent private sections. The major coal seam, Hanna #1, has variable but high Btu values, variable but generally low sulfur content, and variable ash content. The seam called Bed 78 may also be included in a mining plan. There is no contract for coal from this lease as yet, as a supplement to the production of the nearby Seminoe #2 Mine. Given the variable Btu, ash and sulfur content of this coal, its marketability will change dramatically from time to time and stockpiling may be the only way to maintain continuous operation. Coal may also be blended with coal produced at Seminoe #2.

Arch Minerals is in the process of preparing a mining permit, which they hope to submit in mid-1981. They plan a 0.5 to 0.6 mty capacity mine, with the start of production in 1983 and reaching a peak in 1985. Given the demand for southern Wyoming coal, under either high or low demand scenarios, it is expected that the block will be producing by 1986, and will meet diligent development deadlines. Mining will be by truck/shovel and dragline.

A number of environmental problems need to be resolved in mine plan development:

Adequate drainage and post-mining contouring plan has yet to be proposed.

The area is a scenic corridor.

The area is a nesting area for sage grouse.

Because of mine proximity to the town of Hanna, Wyoming, there may be difficulty meeting dust standards acceptable to the local environment.

UNDEVELOPED LEASE BLOCK SUMMARY SHEET

Lease Block Name: Cherokee
Map Ref. No. 40 (Map 2.2)

Owner/ Parent Co. NERCO, Inc. (Pacific Power & Light)
County: Sweetwater
State: WY
Location: T19N R92W
AMS Sheet Rawlins
7.5' Quad Creston, Creston Junction, High Pt Seaverson Res.

LEASE DATA

Lease Number	Acres	Reserves M Tons	Btu/lb.	Sulfur %	Sulfur #M Btu	Ash (%)	Seam thick. (ft.)	Overburden thick. (ft.-ave.)	ratio
WO 312917	480		-	-	-	-	>15		
WO 313559	640		8000	1.75	2.2	14.6	>15		
WO 92140	671		8000	1.75	2.2	14.6	>15		
WO 92141	2480		8000	1.75	2.2	14.6	>15		
Total/ Average	4271	>180 surface reserves							

APPLICATION OF SCREENS

Primary Screens								Secondary Screens (+ favorable - unfavorable)						PRLAs		
						Overburden										
LMU	Res.	Btu	S	Ash	Seam Thick.	Thick.	Ratio	Own.	Act.	Tran.	Geo.	Env.	Leg.	Clms.	LMU.	Irr.
yes	yes	yes	no	yes	yes			+	-	na	+	-	+			

Development Prospects: favorable If favorable, suitable for no steam (export) yes steam (on-site) yes synthetic fuels (on-site)

Production Prospects 1986: Unfavorable 1991: Uncertain, contingent on synfuel development.

COMMENTS:

Low Btu content and high sulfur and ash content mean development of this lease is contingent on its possibilities for on-site conversion. 300 million tons of reserves have been dedicated for a proposed synfuel (Rocky Mountain Energy is currently conducting feasibility studies on this proposal). A power plant has also been proposed in connection with the deposit.

The tract was covered as a site specific EIS in the Southcentral Wyoming Regional EIS (BLM 1978a). DEQ indicates there is not much evidence of current activity in terms of preparing a permit application. Most of the tract is covered by sage grouse crucial nesting area but according to the Wyoming Fish and Game, large game are not likely to be adversely affected, at least not compared to the neighboring proposed lease tracts, China Butte and Red Rim. There is evidence that the coals in the tract may be uraniferous. Reclamation will probably be difficult due to low rainfall and predominantly sandy and loamy soils on the tract.

OTA initially judged production prospects to be uncertain (1986) and favorable (1991), but the Task Force changed this to unfavorable (1986) and uncertain (1991). One affecting the lease is that the sulfur content seems to be too high to meet Wyoming's SO_2 emission standard.

OTA Follow-up (From Schmidt, Porte and Silverman, 1980)

Federal coal in this lease block is checkerboarded with fee coal held by Rocky Mountain Energy. NERCO and Rocky Mountain Energy (RME) plan development of the lease for high Btu syngas. They have applied for funds from DOE for a feasibility study and expect to hear about the grant in December, 1980. The Cherokee coal field encompasses 11,000 acres and at least three possible mine sites are being examined. The anticipated production from the LMU will be 6 mty to feed a first stage 125,000 foot/day, high Btu syngas plant.

Cherokee continued

NERCO and RME propose production from the lease block will begin in 1983 and will reach six mty production by 1986. Mining will be from the surface and a small area of the lease may be excluded from mining by alluvial valley floors. No other serious environmental problems are anticipated.

Inasmuch as permitting has not yet started for the mine, and the syngas plant feasibility study cannot begin before 1982, it appears more likely that mine production could not start for several years. It is thus estimated that if the project is feasible, which is not certain, production could begin in 1988 and reach five mty in 1990.

UNDEVELOPED LEASE BLOCK SUMMARY SHEET

Lease Block Name: Peabody (2) (Boars Tusk) Map Ref. No. 41 (Map 3.1)

Owner/
Parent Co. Peabody Coal Co.

County: Sweetwater
State: WY

Location: T23N R103W
AMS Sheet Rock Springs
7.5' Quad Boars Tusk (15')

LEASE DATA

Lease Number	Acres	Reserves	Btu/lb.	Sulfur		Ash	Seam thick.	Overburden thick.	ratio
		M Tons		%	#M Btu	(%)	(ft.)	(ft.-ave.)	
WO 220486	1840	GMO ACLDS	9000	1.0	1.11	4.9	<15		
W 3438	640		10200	0.90	0.88	17.5	<15		
			10850	0.80	0.73	2.8			
			11,518	0.70	0.61	12.7	<15		

Total/
Average 2480 <30 Surface reserves, no underground reserves

APPLICATION OF SCREENS

Primary Screens								Secondary Screens (+ favorable - unfavorable)						PRLAs		
					Seam	Overburden										
LMU	Res.	Btu	S	Ash	Thick.	Thick.	Ratio	Own.	Act.	Tran.	Geo.	Env.	Leg.	Clms.	LMU.	Irr.
no	no	yes	mar	mar	no											

Development Prospects: Unfavorable If favorable, suitable for ____ steam (export)
____ steam (on-site) ____ synthetic fuels (on-site)

Production Prospects 1986: Unfavorable 1991: Unfavorable

COMMENTS:

The main factors that make this tract unfavorable for development are small reserves and thin seams. High variability of sulfur and ash also make tract unfavorable.

The USGS District Mining Supervisor recommended that the lease not be issued in the first place, but was overruled. The tract includes critical elk and mule deer habitat and crosses game migratory routes. The lease is adjacent to the Sand Dunes Wilderness Inventory Unit which has been recommended for further study as a possible wilderness area by BLM. There is no evidence of any activities to provote development of the lease.

UNDEVELOPED LEASE BLOCK SUMMARY SHEET

Lease Block Name: Long Canyon Map Ref. No. 42 (Map 3.1)

Owner/ Parent Co.	Sunoco Energy Development	County: Sweetwater State: WY	Location: T21N R103W AMS Sheet Rock Springs 7.5' Quad Boars Tusk (15')

LEASE DATA

Lease Number	Acres	Reserves M Tons	Btu/lb.	Sulfur %	Sulfur #M Btu	Ash (%)	Seam thick. (ft.)	Overburden thick. (ft.-ave.)	ratio
WO 313201	14,680	ACLDS	10,300- 11,790	0.6- 1.0	0.52- 0.92	3.2- 4.5	> 5		
		GMO	10,037- 11,256	0.60- 0.80	0.54- 0.80	3.1- 6.0	> 5		
Total/ Average		63 underground reserves							

Reserves data from BLM (1978a). Total reserves are probably much higher.

APPLICATION OF SCREENS

Primary Screens								Secondary Screens (+ favorable - unfavorable)						PRLAs		
					Seam	Overburden										
LMU	Res.	Btu	S	Ash	Thick.	Thick.	Ratio	Own.	Act.	Tran.	Geo.	Env.	Leg.	Clms.	LMU.	Irr.
yes	yes	yes	yes	yes	yes			+	+	+	+	-	+			

Development Prospects: Favorable If favorable, suitable for yes steam (export)
? steam (on-site) ? synthetic fuels (on-site)

Production Prospects 1986: Uncertain 1991: Favorable
OTA Follow-up: Favorable

COMMENTS:

This block contains some 15 coal seams, about half of which are proposed for mining. Most of the seams to be mined appear to be in compliance with the 1970 NSPS. This combined with the high Btu content and low ash content give these reserves a good market potential, although according to Glass (1980), the mine has no contracts. About 85% of the reserves must be mined by underground methods. Most of the surface coal is oxidized, so any mining of surface reserves would probably not be for export. The Southwestern Wyoming Regional Coal says the mine would supply power plants in Idaho, Oregon and Utah. A synfuel plant has been proposed in the past and 30,000 acre-feet/year may be available from the Fontanelle Reservoir on the Green River. The proposal is not now in the active planning stages.

Long Canyon mine was covered by the SW WY EIS (BLM 1978b) as a site specific proposal, and start-up production was originally scheduled for 1980. This schedule has slipped because Rocky Mountain Energy, which controls the railroad reserves checkerboarded with the federal lease reserves, pulled out of the mine project. Some revegetation studies are underway and DEQ in Lander has had indications that a permit application is being put together. Four drill rigs are presently at the site and USGS expects a mine plan early next year. Wyoming Game and Fish indicates there are some potential adverse effects on the Elk herd and Deer herd at Table Mountain

Production prospects by 1986 are uncertain due both to soft coal markets, and also because production lead time for an underground mine is longer than for a surface mine. Production prospects for 1991 are favorable.

OTA follow-up (from Schmidt, Porte and Silverman, 1980):

Long Canyon continued

This lease block is located in Sweetwater County, Wyoming. Fifteen or more coal seams of high Btu and low ash and sulfur content are found in the block. Reserves have not been calculated but they are considered to be high enough in aggregate to be considered for commercial development. The bulk of the coal (estimated at 85%) would have to be mined underground. A mine plan is currently under development by Morrison-Knudsen, Inc., accompanied by extensive drilling directed at resource, vegetation, hydrologic and environmental data base gathering. A formal corporate decision on project viability is due in mid-1981. Application for a mining permit could be ready by the latter part of 1981 but is more likely in 1982. Such a schedule could have coal production start in 1984 from a surface mine, provided contracts could be signed. At present, none of the coal has been sold and it is considered more likely that production will begin in 1985.

Rocky Mountain Energy Company, which controls the checkerboard fee coal, has withdrawn from the project and conversations with Sunoco Energy Development indicate that the mine plan being developed now differs significantly from the one reviewed in the southwestern EIS. Surface mineable reserves are reportedly more abundant than originally anticipated. In the absence of any other estimates, however, the production stream proposed in the EIS is used. Since markets for southern Wyoming coal are more assured than in the Powder River Basin, it is expected that markets will be developed.

UNDEVELOPED LEASE BLOCK SUMMARY SHEET

Lease Block Name: Rainbow No. 8 (Columbine No. 8)   Map Ref. No. 44 (Map 3.1)

Owner/
Parent Co. Sweetwater Resources

County: Sweetwater
State: WY

Location: T18N R105W
AMS Sheet Rock Springs
7.5' Quad Rock Springs, Ka

LEASE DATA

Lease Number	Acres	Reserves M Tons		Btu/lb.	Sulfur %	 #M Btu	Ash (%)	Seam thick. (ft.)	Overburden thick. (ft.-ave.)	ratio
BO 15155	1752	30	GMO ACLDS	12,344- 12,672 12,278- 13,672	0.79- 1.00 0.90- 1.20	0.64- 0.79 0.66- 0.94	2.3- 3.9 3.5- 9.3	2 seams <5 3 seams >5 5 seams <5		

Total/
Average

APPLICATION OF SCREENS

Primary Screens								Secondary Screens						PRLAs		
								(+ favorable - unfavorable)								
					Seam	Overburden										
LMU	Res.	Btu	S	Ash	Thick.	Thick.	Ratio	Own.	Act.	Tran.	Geo.	Env.	Leg.	Clms.	LMU.	Irr.
no	no	yes	yes	yes	yes											

Development Prospects: Unfavorable   If favorable, suitable for ____ steam (export)
____ steam (on-site) ____ synthetic fuels (on-site)

Production Prospects 1986: Unfavorable   1991: Unfavorable

COMMENTS:

This underground mine shut down in 1977 because of poor roof conditions and faulting. Geotechnical problems and small reserves create unfavorable prospects for reopening the mine.

UNDEVELOPED LEASE BLOCK SUMMARY SHEET

Lease Block Name: North North Block

Map Ref. No. 47 (Map 3.2)

Owner/ Parent Co. Kemmerer Coal Co.

County: Lincoln
State: WY

Location: T22N R116W
AMS Sheet Ogden
7.5' Quad Kemmerer (15')

LEASE DATA

Lease Number	Acres	Reserves M Tons	Btu/lb.	Sulfur %	Sulfur #M Btu	Ash (%)	Seam thick. (ft.)	Overburden thick. (ft.-ave.)	ratio
WO 75206	1247	<30	9604	0.76	0.79	5.7	>15		
		GMO ACLDS	9550- 9604	0.60- 0.80	0.63- 0.83	5.3- 5.7	>15		
Total/ Average									

APPLICATION OF SCREENS

Primary Screens								Secondary Screens (+ favorable - unfavorable)						PRLAs		
LMU	Res.	Btu	S	Ash	Seam Thick.	Overburden Thick.	Ratio	Own.	Act.	Tran.	Geo.	Env.	Leg.	Clms.	LMU.	Irr.
yes	?	yes	yes	yes	yes			+	-	+	-	-	+			

Development Prospects: Uncertain

If favorable, suitable for yes steam (export) no steam (on-site) no synthetic fuels (on-site)

Production Prospects 1986: Unfavorable

1991: Uncertain, contingent on integration into North Block LMU

COMMENTS:

OTA Follow-up: Unfavorable

This lease lies just north of the proposed North Block mine. Production prospects ar generally unfavorable (reserves are small and seam thickness criteria for surface mining is not met) except for the possibility that the lease could be developed as an extension of the North Block mine. USGS indicates there is considerable uncertainty about the extent of the reserves, and it is not clear whether further exploration would identify additional significant quantities of reserves. Coal seams dip moresteeply than on the North Block lease. Since there have been no specific proposals to develop the lease, production prospects by 1986 are unfavorable. Production prospects by 1991 are uncertain and are probably contingent on integration into the North Block LMU. If the lease is integrated into the North Block LMU, it wouldn't have to produce coal by 1986 or 1991 to meet diligence requirements. Follow-up contacts with Kemmerer Coal Company indicate there are no plans to integrate the North-North Block lease into the North Block mine, so production prospects were changed to unfavorable in 1991. The North end of the lease runs into alluvial valley floor of the Hams Fork River. This is critical habitat for a small moose herd.

UNDEVELOPED LEASE BLOCK SUMMARY SHEET

Lease Block Name: North Block Map Ref. No. 48 (Map 3.2)

Owner/ Parent Co. Kemmerer Coal Co.

County: Lincoln
State: WY

Location: T21W R116W
AMS Sheet Ogden
7.5' Quad Kemmerer (15')

LEASE DATA

Lease Number	Acres	Reserves	Btu/lb.	Sulfur		Ash	Seam thick.	Overburden thick.	ratio
		M Tons		%	#M Btu	(%)	(ft.)	(ft.-ave.)	
WO 294513	519	GMO ACLDS	9070	0.38	0.42	8.1	> 15		
WO 56471	960		9452	0.60	0.63	6.3	> 15		
WO 60274	745		9401	0.55	0.56	5.7	> 15		
WO 75207A	407		9084	0.64	0.70	2.9	> 15		
			9084-9550	0.6	0.63-0.66	2.9-5.3	> 15		

Total/ Average 54 surface reserves

Reserve data from BLM (1978b) includes non-Federal coal and is probably conservative.

APPLICATION OF SCREENS

Primary Screens								Secondary Screens (+ favorable - unfavorable)						PRLAs		
						Overburden										
LMU	Res.	Btu	S	Ash	Seam Thick.	Thick.	Ratio	Own.	Act.	Tran.	Geo.	Env.	Leg.	Clms.	LMU.	Irr.
yes	yes	yes	yes	yes	yes			+	+	+	+	-	+			

Development Prospects: Favorable If favorable, suitable for yes steam (export) no steam (on-site) no synthetic fuels (on-site)

Production Prospects 1986: Favorable 1991: Favorable

COMMENTS:

Earlier permit application was rejected by DEQ as incomplete. Kemmerer is actively working on a new permit application and USGS expects permit application before December. The mine was covered as a site specific proposal in the SW WY EIS (1978b). The reserves were allocated to Utah Power and Light's Naughton No. 4 at Kemmerer, which was originally planned for 1978, then delayed to 1982 and then shelved. UP&L has announced a new plant in 1988 which could be a new unit at Kemmerer. There are some market uncertainties which could delay production, but according to Kemmerer, if they can get a permit they have a market. The east side of the lease borders alluvial valley floor, but coal seams dip away from the AUF, which should reduce the likelihood of significant impacts.

UNDEVELOPED LEASE BLOCK SUMMARY SHEET

Lease Block Name: Twin Creek

Map Ref. No. 49 (Map 3.2)

Owner/
Parent Co. Cumberland Coal Co.
(Peter Kiewit & Rocky
Mountain Energy)

County: Lincoln
State: WY

Location: T21N R116W
AMS Sheet Ogden
7.5' Quad Kemmerer (1t')

LEASE DATA

Lease Number	Acres	Reserves	Btu/lb.	Sulfur		Ash	Seam thick.	Overburden thick.	ratio
		M Tons		%	#M Btu	(%)	(ft.)	(ft.-ave.)	
WO 75207B	306	ACLDS	9084	0.64	0.70	2.9	15		
Total/ Average		40 surface reserves							

Reserve data from BLM (1978b) includes non-federal reserves.

APPLICATION OF SCREENS

Primary Screens								Secondary Screens (+ favorable - unfavorable)						PRLAs		
					Seam	Overburden										
LMU	Res.	Btu	S	Ash	Thick.	Thick.	Ratio	Own.	Act.	Tran.	Geo.	Env.	Leg.	Clms.	LMU.	Irr.
yes	yes	yes	yes	yes	yes			+	+	+	+	-	+			

Development Prospects: Favorable   If favorable, suitable for yes steam (export)
no steam (on-site) no synthetic fuels (on-site)

Production Prospects 1986: Uncertain (production contingent on integration into adjacent LMU)   1991: Favorable

COMMENTS: OTA Follow-up: Unfavorable   Favorable contingent on integration into adjacent LMU's

This is being assigned to Cumberland Coal Co. by Kemmerer Coal Co. A mistake in issuance of the original lease has delayed actual assignment. This mine was covered as a site specific proposal in the SW WY EIS (1978b). Production was scheduled to being 1979, but a permit application was rejected by DEQ because of problems with springs and artesian aquifers at the site. Production prospects by 1986 were judged initially by OTA to be uncertain because it is not clear these environmental problems can be dealt with satisfactorily. Glass (1980) does not list Twin Creek as a mine likely to be in production by 1990. It now appears the block will be split and integrated into the North Block tract, and the Elkol-Sorenson which is already in production, and the Task Force gave the lease favorable production prospects, contingent on integration into adjacent LMU's.

OTA follow-up (from Schmidt, Porte and Silverman, 1980):

Cumberland Coal has made the decision that this lease will not be developed as a separate mine, but rather will be integrated into existing and planned Kemmerer Coal Co. operations. Twin Creek lies between the active Elkol-Swenson Mine and the undeveloped National Block leases. Negotiations with Kemmerer Coal are unresolved at this time, however, and no mine planning is underway for Twin Creek. As such, development is not expected until after 1986.

An earlier regulatory review of the Twin Creek proposal indicated problems with artesian aquifers. According to company officials, however, these problems are largely resolvable.

UNDEVELOPED LEASE BLOCK SUMMARY SHEET

Lease Block Name: South Haystack Map Ref. No. 52 (Map 3.2)

Owner/ Parent Co. Cumberland Coal Company/ Peter Kiewit and Sons and Rocky Mountain Energy Company

County: Uinta
State: WY

Location: T16-17N, R117-1
AMS Sheet Ogden
7.5' Quad Meadow Draw

LEASE DATA

Lease Number	Acres	Reserves	Btu/lb.	Sulfur		Ash	Seam thick.	Overburden thick.	ratio
		M Tons		%	#M Btu	(%)	(ft.)	(ft.-ave.)	
W060241	1408	30	9,416- 9,908	0.31- 1.15	0.32- 1.1	4.2- 6.9	4-70 (7 seams	-	-
Total/ Average									

APPLICATION OF SCREENS

Primary Screens								Secondary Screens						PRLAs		
						Overburden		(+ favorable - unfavorable)								
LMU	Res.	Btu	S	Ash	Seam Thick.	Thick.	Ratio	Own.	Act.	Tran.	Geo.	Env.	Leg.	Clms.	LMU.	Irr
yes	yes	yes	yes	yes	yes	-	-	+	+	+	+	-	+			

Development Prospects: Favorable If favorable, suitable for yes steam (export)
no steam (on-site) no synthetic fuels (on-site)

Production Prospects 1986: Favorable 1991: Favorable

COMMENTS:

South Haystack was classified as a developed lease at the time of the Wyoming Task Force meeting and consequently was not evaluated by the Task Force. Later evaluation of the lease found that permit approbal was not likely unitl after 1980 and consequently the lease was reclassified as undeveloped.

OTA follow-up (from Schmidt, Porte and Silverman, 1980):

The South Haystack mine proposal was addressed in the Southwestern Wyoming environmental statement. A permit application was subsequently submitted to the Wyoming DEQ. Currently, the plan is undergoing a completeness review by the DEQ and the OSM. Approval of a permit can be expected in late 1981 or early 1982, and production could begin in 1984. Since no markets have been identified for this coal, production in 1985 is considered more likely. Mine design capacity will be 3 mty and markets are expected to develop by 1985.

The LMU integrates federal coal, state coal, and fee coal controlled by Rocky Mountain Energy Company. Together, the mine plan contains about 64.8 mt of recoverable reserves (Cumberland Coal Co., 1979). The mine plan area is located 2.5 miles east of the overthrust belt in southwestern Wyoming. On the proposed site, seams dip over 20 degrees on the limb of a syncline.

A conventional open pit truck/shovel operation will be developed. Coal will be excavated from 3 pits, ranging from 100 to 800 feet in depth. The mine plan will result in concern about out-of-pit spoil disposal, similar to that raised about the Black Butte mine proposal. These regulatory concerns may delay approval, but it is very unlikely to delay a 1985 production schedule.

UNDEVELOPED LEASE BLOCK SUMMARY SHEET

Lease Block Name: Cottonwood

Map Ref. No. 53 (Map 3.3)

Owner/ Parent Co. Connoton Land Co. (Cravat Coal Co.)

County: Sublette

State: WY

Location: T33N R115W

AMS Sheet Preston

7.5' Quad none

LEASE DATA

Lease Number	Acres	Reserves M Tons	Btu/lb.	Sulfur %	Sulfur #M Btu	Ash (%)	Seam thick. (ft.)	Overburden thick. (ft.-ave.)	ratio
EO 18804	160	<30 under-ground reserves	12220	0.60	0.49	5.0	>5		

Total/ Average ACLDS and GMO coal quality data the same.

APPLICATION OF SCREENS

Primary Screens								Secondary Screens (+ favorable - unfavorable)						PRLAs		
LMU	Res.	Btu	S	Ash	Seam Thick.	Overburden Thick.	Overburden Ratio	Own.	Act.	Tran.	Geo.	Env.	Leg.	Clms.	LMU.	Irr.
no	no	yes	yes	yes	yes											

Development Prospects: Unfavorable If favorable, suitable for _____ steam (export) _____ steam (on-site) _____ synthetic fuels (on-site)

Production Prospects 1986: Unfavorable 1991: Unfavorable

COMMENTS:

The main reason this block has unfavorable development prospects is the low reserves. The site was previously mined from 1938 to 1958. An application for a mine permit was filed by the previous leaseholder George Hendon, but after several rejections for lack of completeness, he gave up and assigned the lease to Cravat. The most recent application rejection was November 30, 1979.

The seam dips steeply (20-25°) and poor roof conditions create further difficulties for mine development. The mine is not located near any rail line. Located in the Bridger Teton National Forest.

UNDEVELOPED LEASE BLOCK SUMMARY SHEET

Lease Block Name: Deadman   Map Ref. No. 54 (Map 3.3)

Owner/ Parent Co. Connoton Land Co. (Cravat Coal Co.)

County: Lincoln   Location: T35N R116W
State: WY   AMS Sheet Preston
7.5' Quad Pickle Pass

LEASE DATA

Lease Number	Acres	Reserves	Btu/lb.	Sulfur		Ash	Seam thick.	Overburden thick.	ratio
		M Tons		%	#M Btu	(%)	(ft.)	(ft.-ave.)	
WO 23373	240	<30 GMO	14,000	0.60	0.45	5.0	>5		
		Under-ground reserves	13,000	0.42	0.32	2-3			
Total/ Average									

ACLDS and GMO coal quality data are the same. Additional data are from Coal Week.

APPLICATION OF SCREENS

Primary Screens								Secondary Screens (+ favorable - unfavorable)						PRLAs		
LMU	Res.	Btu	S	Ash	Seam Thick.	Overburden Thick.	Overburden Ratio	Own.	Act.	Tran.	Geo.	Env.	Leg.	Clms.	LMU.	Irr.
no	no	yes	yes	yes	yes											

Development Prospects: Unfavorable   If favorable, suitable for ____ steam (export) ____ steam (on-site) ____ synthetic fuels (on-site)

Production Prospects 1986: Unfavorable   1991: Unfavorable

COMMENTS:

This lease has some of the highest quality coal in the state, but small reserves and isolated location, as well as the necessity of underground mining, make development prospects unfavorable. Steep dip of 25° creates further difficulties. According to the US Forest Service some samples were taken from the mine two or three years ago., but there is no current activity to develop the mine. Lease is located in Bridger-Teton National Forest. OTA follow-up: Coal Week (March 16, 1981) reports that Sparrow Resources and Peregrine Petroleum are forming a joint venture to develop the lease with planned production of 250,000 tons/year in spring 1982 increasing to 500,000 tons/year. The report indicates a possible contract to supply a power plant, and consideration is being given to export sales. However, reserves on the lease are too small to support a mine at even the lower production levels cited, and OTA concluded that these reported plans did not justify changing the rating of the lease.

UNDEVELOPED LEASE BLOCK SUMMARY SHEET

Lease Block Name: Granite Creek Map Ref. No. 55 (Map 3.3)

Owner/
Parent Co. Granite Creek Coal Co.

County: Teton
State: WY

Location: T39N R114W
AMS Sheet Driggs
7.5' Quad Bull Creek

LEASE DATA

Lease Number	Acres	Reserves	Btu/lb.	Sulfur		Ash	Seam thick.	Overburden thick.	ratio
		M Tons		%	#M Btu	(%)	(ft.)	(ft.-ave.)	
EO 19039	280	<30 Under-ground reserves	-	-	-	-	<5		

Total/
Average Neither ACLDS or GMO have coal quality data

APPLICATION OF SCREENS

Primary Screens								Secondary Screens (+ favorable - unfavorable)						PRLAs		
					Seam	Overburden										
LMU	Res.	Btu	S	Ash	Thick.	Thick.	Ratio	Own.	Act.	Tran.	Geo.	Env.	Leg.	Clms.	LMU.	Irr.
no	no	-	-	-	no											

Development Prospects: Unfavorable If favorable, suitable for ____ steam (export)
____ steam (on-site) ____ synthetic fuels (on-site)

Production Prospects 1986: Unfavorable 1991: Unfavorable

COMMENTS:

Granite Creek Coal Company is in the process of relinquishing this lease. Lease is located in Teton National Forest.

UNDEVELOPED LEASE BLOCK SUMMARY SHEET

Lease Block Name: Kowlok
Map Ref. No. 56 (Map 3.4)

Owner/Parent Co. Northwestern Resources
County: Hot Springs
State: WY
Location: T44N R96W
AMS Sheet Thermopolis
7.5' Quad Blue Mesa

LEASE DATA

Lease Number	Acres	Reserves M Tons	Btu/lb.	Sulfur %	Sulfur #M Btu	Ash (%)	Seam thick. (ft.)	Overburden thick. (ft.-ave.)	ratio
CO 69111	120	<30	-	-	-	-	<5.0		

Total/Average

No coal quality data in ACLDS and no GMO data available.

APPLICATION OF SCREENS

Primary Screens								Secondary Screens (+ favorable - unfavorable)						PRLAs		
LMU	Res.	Btu	S	Ash	Seam Thick.	Overburden Thick.	Ratio	Own.	Act.	Tran.	Geo.	Env.	Leg.	Clms.	LMU.	Irr.
no	no	-	-	-	yes											

Development Prospects: Unfavorable If favorable, suitable for ____ steam (export) ____ steam (on-site) ____ synthetic fuels (on-site)

Production Prospects 1986: Unfavorable 1991: Unfavorable

COMMENTS:

Small size and reserves create unfavorable development prospects. Lease has abandoned mine workings, but is surrounded by unleased federal coal. Sixty-two acres surface minable. There is no evidence of efforts to develop the lease.

UNDEVELOPED LEASE BLOCK SUMMARY SHEET

Lease Block Name: Western Nuclear　Map Ref. No. 57 (Map 3.4)

Owner/
Parent Co. Western Nuclear

County: Hot Springs
State: WY

Location: T44N R96W
AMS Sheet Thermopolis
7.5' Quad Blue Mesa

LEASE DATA

Lease Number	Acres	Reserves M Tons		Btu/lb.	Sulfur %	Sulfur #M Btu	Ash (%)	Seam thick. (ft.)	Overburden thick. (ft.-ave.)	ratio
WO 22978	80	< 30	GMO ACLDS	9716	0.58	0.60	-			
				10030	0.49	0.49	-	> 20		
				9623	0.59	0.61	13.8			
				10076	0.49	0.49	9.6	> 20		

Total/
Average

APPLICATION OF SCREENS

Primary Screens: LMU	Res.	Btu	S	Ash	Seam Thick.	Overburden Thick.	Overburden Ratio	Secondary Screens (+ favorable - unfavorable): Own.	Act.	Tran.	Geo.	Env.	Leg.	PRLAs: Clms.	LMU.	Irr.
no	no	yes	yes	mar	yes		–									

Development Prospects: Unfavorable　If favorable, suitable for ______ steam (export)
_____ steam (on-site) _____ synthetic fuels (on-site)

Production Prospects 1986: Unfavorable　1991: Unfavorable

COMMENTS:

Small size and minimal reserves create unfavorable development prospects. Lease includes abandoned mine workings, but is surrounded by unleased federal coal. Seams dip 17°. Two-thirds of reserves are surface minable, the rest by underground methods. There is no evidence of efforts to develop the lease.

PRLA Block Name: Woodson (Ulm Project) Map Ref. No. P1 (Map 1.1)

Owner/
Parent Co. Fred Woodson

County: Sheridan
State: WY

Location: T54N R81W
AMS Sheet Sheridan
7.5' Quad Verona, Ulm
Horse Hill, Ucross

LEASE DATA

Lease Number	Acres	Reserves	Btu/lb.	Sulfur		Ash	Seam thick.	Overburden thick.	ratio
		M Tons		%	#M Btu	(%)	(ft.)	(ft.-ave.)	
W3818	1520		-	-	-	-	> 20		
W3819	3999		-	-	-	-	> 20		
			7650	0.56	0.73	7.6	> 20		2.8
			7770	0.93	1.20	7.1			6.2
Total/ Average	5519	> 30	Coal quality data and strip ratio from unpublished USGS data, Casper.						

APPLICATION OF SCREENS

Primary Screens								Secondary Screens (+ favorable - unfavorable)						PRLAs		
						Overburden										
LMU	Res.	Btu	S	Ash	Seam Thick.	Thick.	Ratio	Own.	Act.	Tran.	Geo.	Env.	Leg.	Clms.	LMU.	Irr.
?	no	yes	yes	yes	yes	-	no							+	+	+

Development Prospects: Unfavorable If favorable, suitable for ____ steam (export)
____ steam (on-site) ____ synthetic fuels (on-site)

Production Prospects 1994: Unfavorable

COMMENTS:

This PRLA does not meet coal quality criteria for export, and federal reserves are not sufficient to support an on-site conversion facility. The block is associated with two large state leases held by Carter that cover approximately 17,000 acres and contain approximately 6400 acres of strippable coal. If reserves on the state lease have a similar seam and overburden thickness for the Walters seam (Ave. 38 feet thick) total non-federal reserves could exceed 400 million tons. The acreage and reserves of nonfederal coal were estimated from Glass (1978). The Wyoming Natural Heritage Program data indicates that a Black-footed ferret skull has been found in the vicinity of the lease.

This block could possibly support an on-site synfuels plant, if combined with adjacent non-federal coal and OTA initially judged development prospects as favorable for this reason. However, the Task Force changed this to unfavorable because ownership was split and because there are no announced plans to develop the block.

PRLA Block Name: Thunderbird
Map Ref. No. P2 (Map 1.3)

Owner/
Parent Co. El Paso Coal Co.

County: Campbell and Johnson
State: WY

Location: T48-51N R75-77w
AMS Sheet Sheridan & Gillett
7.5' Quad Carr Draw, Somerville Flat E, Lask Draw, Morgan Draw

LEASE DATA

Lease Number	Acres	Reserves M Tons	Btu/lb.	Sulfur %	Sulfur #M Btu	Ash (%)	Seam thick. (ft.)	Overburden thick. (ft.-ave.)	ratio
12 total (see Appendix 1 for complete list of serial numbers)	23928	180 ACLDS	-	-	-	-	< 20		
		WCPAP	7600	0.6	0.8	13.4	12-15		
		USGS	8207	1.1	1.4	8.0	< 20		>6.0

Total/
Average

Coal quality data from Western Coal Planning Assistance Project (1979) and unpublished USGS data, Casper.

APPLICATION OF SCREENS

Primary Screens								Secondary Screens (+ favorable - unfavorable)						PRLAs		
LMU	Res.	Btu	S	Ash	Seam Thick.	Overburden Thick.	Overburden Ratio	Own.	Act.	Tran.	Geo.	Env.	Leg.	Clms.	LMU.	Irr.
yes	yes	yes	yes	yes	no		no							+	na	+

Development Prospects: Unfavorable
If favorable, suitable for _____ steam (export) _____ steam (on-site) _____ synthetic fuels (on-site)
OTA follow-up: Uncertain (development contingent on in situ gasification)
Production Prospects 1994: Unfavorable

COMMENTS:

This block does not meet the seam thickness and overburden ratio primary screens. Some reserves are probably available at a ratio of less than 3.^{5}, but this would probably reduce reserves estimates considerably. Coal quality data is contradictory, but it appears to be only suitable for onsite conversion because although USGS data indicate heat content suitable for export, the sulfur content is too high. Glass (1974) indicates that the ULM seam averages less than 8,000 Btu/lb. The block contains 12 separate lease applications, yet only one (W58482) contains reserve data in ACLDS. This discrepancy may be due to the way the data was entered into ACLDS, since BLM has a letter from USGS dated June 1, 1972, stating fulfillment of requirements concerning demonstration of commercial quantities. This lease is also one of the few PRLAs listed as a proposed mine, with several sources indicating a production capacity of 5 MTPY, and for this reason OTA initially judged the block to have uncertain development prospects However, there is no indication that El Paso is actively promoting development of the block and consequently the Task Force judged development prospects to be unfavorable.
The block probably has substantial underground reserves that might be suitable for in-situ gasification, and consequently OTA's follow-up changed the development prospects to uncertain, contingent on in-situ gasification. Production prospects were still considered unfavorable, since underground reserves are unlikely to quality as commercial quantities for granting of preference right leases.

The streams that run through the block enter the Powder River just to the west along the segments of the River that support the main population areas of the Sturgeon Chub and the Goldeye, which are both considered to be rare and endangered fish species in the state. (Wyoming Natural Heritage Program, 1980). Three of the leases (W1598, W4996 and W56844) have high or possibly high wildlife values (USDI 1978b).

PRLA Block Name: Wold-Jenkins (1) - (4)

Map Ref. No. P3-P6 (Map 1.3)

Owner/ Parent Co.: John S. Wold and Page T. Jenkins

County: Campbell and Johnson

State: WY

Location: T47-51N R75-77W

AMS Sheet: Sheridan & Gillett

7.5' Quad: same as P2

LEASE DATA

Lease Number		Acres	Reserves	Btu/lb.	Sulfur		Ash	Seam thick.	Overburden thick.	ratio
			M Tons		%	#M Btu	(%)	(ft.)	(ft.-ave.)	
13 PRLAs in 4 blocks. See Appendix 1 for serial numbers.	P3	7361	-	-	-	-	-	-		
	P4	13,770	-	-	-	-	-	-		
	P5	1755	-	-	-	-	-	-		
	P6	5610	-	-	-	-	-	-		

Total/ Average: No surface reserves

APPLICATION OF SCREENS

Primary Screens								Secondary Screens (+ favorable - unfavorable)						PRLAs		
					Seam	Overburden										
LMU	Res.	Btu	S	Ash	Thick.	Thick.	Ratio	Own.	Act.	Tran.	Geo.	Env.	Leg.	Clms.	LMU.	Irr.
no	no	-	-	-	-	-	-							+	na	+

Development Prospects: Unfavorable   If favorable, suitable for ____ steam (export)

OTA Follow-up: Uncertain (development contingent on in-situ gasification)   ____ steam (on-site) ____ synthetic fuels (on-site)

Production Prospects   1994: Unfavorable

COMMENTS:

These PRLAs have been divided into four separate blocks even though they are under the same ownership, because as a group they do not form a single LMU.

This group of leases is problematic in the same way as the Thunderbird block because of conflicting data between ACLDS and USGS. ACLDS indicates very large surface reserves, but again all the reserves are attributed to a single lease application of 997 acres (W59464). Unpublished USGS data indicate large underground reserves in seven coal seams, but the minimum overburden thickness is 300 feet. This makes sense since the uppermost seam is the Ulm downdip from the Thunderbird block, and would be expected to be beyond the stripping limit. For this reason the lease is judged to have unfavorable development prospects. Development for insitu gasification has been proposed, but since this technology is not commercially proven, this would not be sufficient justification for granting the applications. See Thunderbird Summary Sheet (P2) for explanation of change in rating of development prospects by OTA follow-up

In spite of apparent irregularities in ACLDS concerning reserve data, the lease holders have a letter from the Secretary of Interior dated March 27, 1972, indicating commercial quantities had been demonstrated.

The blocks lie about five miles to the east of the stretch of the Powder River that contains population of Sturgeon Chub and Goldeye Fish which are considered rare and endangered in the State. Lease application W2276, W4998 and W5944 may have high wildlife values (USDI 1978b).

PRLA Block Name: Consol (1)

Map Ref. No. P7 (Map 1.5)

Owner/ Parent Co. Consolidation Coal Co.

County: Campbell

State: WY

Location: T54N R72W

AMS Sheet Gillette

7.5' Quad Pitch Draw, Reclus

LEASE DATA

Lease Number	Acres	Reserves M Tons	Btu/lb.	Sulfur %	Sulfur #M Btu	Ash (%)	Seam thick. (ft.)	Overburden thick. (ft.-ave.)	ratio
W11128	999	ACLDS	-	-	-	-	>20		
W8307	3036		-	-	-	-	>20		
W8312	1575		-	-	-	-	>20		
			7767	0.51	0.62	7.0	>20		3.4
			7745	0.35	0.44	5.8	>20		5.4
Total/ Average	5610	>180	Coal quality data for Anderson and Dietz beds from USGS, Casper. Strip ratio based on maximum overburden thickness of 200 feet.						

APPLICATION OF SCREENS

Primary Screens								Secondary Screens (+ favorable - unfavorable)						PRLAs		
LMU	Res.	Btu	S	Ash	Seam Thick.	Overburden Thick.	Overburden Ratio	Own.	Act.	Tran.	Geo.	Env.	Leg.	Clms.	LMU.	Irr.
yes	yes	yes	yes	yes	yes		mar.	+	-	+	+	-	+	-	na	+

Development Prospects: Uncertain

If favorable, suitable for no steam (export) yes steam (on-site) yes synthetic fuels (on-site)

Production Prospects 1994: Unfavorable

COMMENTS:

This block is associated with about 6000 acres of private coal and another 1280 acres of state coal, so total reserves in the block are probably considerably more than the federal reserves. USGS data indicates all the surface minable seams are less than 7,800 Btu/lb so the block is considered suitable only for on-site conversion. The strip ratio for the Anderson and Dietz beds ranges is marginal under today's conditions. There are some oil and gas wells located on the PRLAs which could further delay development, and alluvial valley floor may be present. Over 40% of the block (2305) contains potential alluvial valley floor (USFWS 1980).

Development prospects would be favorable, except that the three PRLAs in the block are covered by 42 mining claims, which could make the block unviable if these areas are excluded from the leases. Consol has asked to have processing of the PRLAs delayed until after the 1983 lease sales, which indicates that the company may not consider the PRLAs to be viable by themselves. The Task Force judged production prospects to be unfavorable for 1994.

PRLA Block Name: Consol (2)
Map Ref. No. P8 (Map 1.5

Owner/ Parent Co. Consolidation Coal Co.
County: Campbell
State: WY
Location: T53N R72W
AMS Sheet Gillette
7.5' Quad Calf Creek, Wildca
Pitch Draw

LEASE DATA

Lease Number	Acres	Reserves	Btu/lb.	Sulfur		Ash	Seam thick.	Overburden thick.	ratio
		M Tons		%	#M Btu	(%)	(ft.)	(ft.-ave.)	
W8308	2544								
W8309	1990								
Total/ Average	4534	>180	Coal data similar to P7						

APPLICATION OF SCREENS

Primary Screens								Secondary Screens (+ favorable - unfavorable)						PRLAs		
						Overburden										
LMU	Res.	Btu	S	Ash	Seam Thick.	Thick.	Ratio	Own.	Act.	Tran.	Geo.	Env.	Leg.	Clms.	LMU.	Irr.
yes	yes	yes	yes	yes	yes	yes	mar.	+	-	+	+	-	+	-	na	-

Development Prospects: Uncertain If favorable, suitable for no steam (export)
yes steam (on-site) yes synthetic fuels (on-site)

Production Prospects 1994: Unfavorable

COMMENTS:

Block is associated with about 3600 acres of private coal and possibly 1240 acres of state coal, so total reserves of the LMU could be about double the federal reserves.

Points discussed under Consol(1) apply to this block as well, including the possible existence of alluvial valley floor and the location of mining claims within the block (the two blocks contain 42 claims). Almost 60% of the block (2590 acres) contains potential alluvial valley floors (USFWS 1980). About 400 acres of this block are isolated from the main block by unleased federal coal. In addition, lease W8309 contains two abandoned underground mines according to Hausel (1979), and it is possible this application could be challenged on the basis that the permit was improperly issued by DOI.

PRLA Block Name: Consol (3) . Map Ref. No. P9 (Map 1.5)

Owner/ Parent Co. Consolidation Coal Co.

County: Campbell

State: WY

Location: T52N R72W

AMS Sheet Gillette

7.5' Quad Calf Creek

Weston SW

LEASE DATA

Lease Number	Acres	Reserves	Btu/lb.	Sulfur		Ash	Seam thick.	Overburden thick.	ratio
		M Tons		%	#M Btu	(%)	(ft.)	(ft.-ave.)	
W8310	1200								
W8311	2440								
Total/ Average	3640	> 30	Coal data similar to P7						

APPLICATION OF SCREENS

Primary Screens								Secondary Screens (+ favorable - unfavorable)						PRLAs		
					Seam	Overburden										
LMU	Res.	Btu	S	Ash	Thick.	Thick.	Ratio	Own.	Act.	Tran.	Geo.	Env.	Leg.	Clms.	LMU.	Irr.
no	no	no	yes	yes	yes		no							-	-	+

Development Prospects: Unfavorable If favorable, suitable for _____ steam (export) _____ steam (on-site) _____ synthetic fuels (on-site)

Production Prospects 1994: Unfavorable

COMMENTS:

This block does not form an LMU--it is separated into four separate blocks even when associated state (1240 acres) and private coal (about 300 acres) are taken into account. Reserves are not sufficient to support on site conversion and heat content is not high enough for export. The MPF update (BLM 1980) indicates that most of this block has low coal development potential. In addition, the block contains 17 mining claims and 450 acres of potential alluvial valley floors (USFWS 1980).

PRLA location on lease map in Buffalo BLM office, the 1980 MPF update and USFWS data base are inaccurate (all three maps have leases located differently).

PRLA Block Name: Peabody (P1) Map Ref. No. P10 (Map 1.6)

Owner/ Parent Co. Peabody Coal Co.

County: Campbell
State: WY

Location: T49N R70W
AMS Sheet Gillette
7.5' Quad Coyote Draw

LEASE DATA

Lease Number	Acres	Reserves M Tons	Btu/lb.	Sulfur %	Sulfur #M Btu	Ash (%)	Seam thick. (ft.)	Overburden thick. (ft.-ave.)	ratio
W26198	2508	ACLDS	-	-	-	-	> 20		
W26199	640		-	-	-	-	> 20		
W32061	80		-	-	-	-	> 20		
W32062	160		-	-	-	-	> 20		
			7754-8120	0.45-0.93	0.58-1.13	9.5-11.6	> 20		
Total/ Average	3388	<30	Coal quality data from USGS, Casper						

APPLICATION OF SCREENS

Primary Screens								Secondary Screens (+ favorable - unfavorable)						PRLAs		
LMU	Res.	Btu	S	Ash	Seam Thick.	Overburden Thick.	Overburden Ratio	Own.	Act.	Tran.	Geo.	Env.	Leg.	Clms.	LMU.	Irr.
no	no	mar	mar	mar	yes	-	-							+	—	-

Development Prospects: Unfavorable If favorable, suitable for ______ steam (export) ______ steam (on-site) ______ synthetic fuels (on-site)

Production Prospects 1994: Unfavorable

COMMENTS:

This block has about a thousand acres of private coal and perhaps two state sections associated with it. Nonfederal coal might increase reserves above 30 million tons but the block still has unfavorable development prospects because heat content, sulfur and ash appear to be of marginal quality for export. The 1980 Gillette MFP update indicates the whole block is within areas of medium and high coal development potential. The Coyote Draw CRO/CDP map shows that most of the area covered by the block contains clinker beds. Mining in extensive areas of clinker may present reclamation problems because of inadequate topsoil and difficulty in restoring recharge capacity after mining. According to USFWS (1980), 80% of the block (2735 acres) contains potential alluvial valley floor.

The area includes at least four abandoned underground mine shafts according to Hausel (1979) which indicates the original prospecting permit may have been improperly issued by the Department of Interior.

PRLA Block Name: Peabody (B2)

Map Ref. No. P11 (Map 1.6)

Owner/
Parent Co. Peabody Coal Co.

County: Campbell
State: WY

Location: T48N R17W
AMS Sheet Gillette
7.5' Quad Coyote Draw, Saddle Horse Butte

LEASE DATA

Lease Number	Acres	Reserves	Btu/lb.	Sulfur		Ash	Seam thick.	Overburden thick.	ratio
		M Tons		%	#M Btu	(%)	(ft.)	(ft.-ave.)	
W32063	520	<30 ACLDS	-	-	-	-	>20		

Total/
Average

APPLICATION OF SCREENS

Primary Screens								Secondary Screens (+ favorable - unfavorable)						PRLAs		
					Seam	Overburden										
LMU	Res.	Btu	S	Ash	Thick.	Thick.	Ratio	Own.	Act.	Tran.	Geo.	Env.	Leg.	Clms.	LMU.	Irr.
yes	no	-	-	-	yes									+	+	+

Development Prospects: Favorable, if integrated into existing LMU

If favorable, suitable for ______ steam (export) ______ steam (on-site) ______ synthetic fuels (on-site)

1994: Production timing depends on mining sequence of Caballo Mine

COMMENTS:

This PRLA is within the mine plan boundaries of Carter Mining Company's Caballo Mine. Peabody does not run the Caballo mine, but since the lease has no value by itself, it can be expected that if the lease is granted that an arrangement would be made to allow the lease to be mined as part of the existing mine operation. However, according to USFWS data (1980), the whole PRLA contains potential alluvial valley floors.

PRLS Block Name: Wold=Jenkins (5) Map Ref. No. P12 (Map 1.6)

Owner/ Parent Co. Page T. Jenkins
John S. Wold

County: Campbell
State: WY

Location: T47N R71W
AMS Sheet Gillette
7.5' Quad Saddle Horse Butt

LEASE DATA

Lease Number	Acres	Reserves M Tons	Btu/lb.	Sulfur %	Sulfur #M Btu	Ash (%)	Seam thick. (ft.)	Overburden thick. (ft.-ave.)	ratio
W4036	80	< 30 ACLDS	– 7974	– 0.33	– 0.40	– 5.1	<20 >20	25	1.0

Total/ Average Coal quality data from USGS, Casper

APPLICATION OF SCREENS

Primary Screens								Secondary Screens (+ favorable - unfavorable)						PRLAs		
LMU	Res.	Btu	S	Ash	Seam Thick.	Overburden Thick.	Overburden Ratio	Own.	Act.	Tran.	Geo.	Env.	Leg.	Clms.	LMU.	Irr.
yes	no	mar.	yes	yes	mar.	yes	yes							+	+	+

Development Prospects: Favorable, if integrated into existing LMU If favorable, suitable for _____ steam (export) _____ steam (on-site) _____ synthetic fuels (on-site)

Production Prospects 1994: Production timing would depend on mining sequence of Cordero Mine.

COMMENTS:

This PRLA is adjacent to Sunedco's Cordero mine. Heat content is just below the 8,000 Btu/lb cutoff for export, but all other primary screens are met. PRLA ownership differs from that of the Cordero mine, but since the lease has little value by itself, it can be expected that if the lease is granted, an arrangement would be made to allow the lease to be mined as part of the existing mine operation.

PRLA Block Name: ARCO (1)
Map Ref. No. P13 (Map 1.7)

Owner/
Parent Co. ARCO

County: Campbell
State: WY

Location: T43N R70W
AMS Sheet Newcastle
7.5' Quad Piney Canyon NW

LEASE DATA

Lease Number	Acres	Reserves	Btu/lb.	Sulfur		Ash	Seam thick.	Overburden thick.	ratio
		M Tons		%	#M Btu	(%)	(ft.)	(ft.-ave.)	
W16877	357	< 30 ACLDS	-	-	-	-	< 20		
							> 20	26-70	

Total/
Average

Additional seam thickness and overburden data from USGS, Casper.

APPLICATION OF SCREENS

Primary Screens								Secondary Screens						PRLAs		
						Overburden		(+ favorable - unfavorable)								
LMU	Res.	Btu	S	Ash	Seam Thick.	Thick.	Ratio	Own.	Act.	Tran.	Geo.	Env.	Leg.	Clms.	LMU.	Irr.
yes	no	-	-	-	yes	yes	-							–	+	-

Development Prospects: Uncertain If favorable, suitable for ______ steam (export) _____ steam (on-site) _____ synthetic fuels (on-site)

Production Prospects

Uncertain
1994: (Favorable if issued and integrated into existing LMU) Production timing would depend on mining sequence of Jacobs Ranch Mi

COMMENTS:

This lease is being processed for the 1984 lease sale in the Powder River Basin. The PRLA is adjacent to Kerr McGee's Jacobs Ranch mine, and for this reason would have favorable development prospects except that several procedural irregularities cloud the application. Coal maps prepared by the USGS (Dobbin and Barnett 1927) show outcrop of coal beds within the PRLA, indicating that the original permit may have been improperly issued by the Department of Interior. Furthermore, USGS files do not provide written proof that information demonstrating commercial quantities had been provided by ARCO during the terms of the permit. The PRLA also contains one mining claim.

PRLA Block Name: ARCO (2) Map Ref. No. P14 (Map 1.7)

Owner/
Parent Co. ARCO

County: Campbell
State: WY

Location: T43N R70W
AMS Sheet Newcastle
7.5' Quad Reno Reservoir
Piney Canyon, NW

LEASE DATA

Lease Number	Acres	Reserves M Tons	Btu/lb.	Sulfur %	Sulfur #M Btu	Ash (%)	Seam thick. (ft.)	Overburden thick. (ft.-ave.)	ratio
W16876	120	ACLDS	-	-	-	-	< 20		
W23932	120		-	-	-	-	< 20		
							> 20	26-70	
Total/ Average	240	< 30							

Additional seam thickness and overburden data from USGS, Casper.

APPLICATION OF SCREENS

Primary Screens								Secondary Screens (+ favorable - unfavorable)						PRLAs		
LMU	Res.	Btu	S	Ash	Seam Thick.	Overburden Thick.	Ratio	Own.	Act.	Tran.	Geo.	Env.	Leg.	Clms.	LMU.	Irr.
yes	no	-	-	-	yes	yes	-							-	+	-

Development Prospects: Uncertain If favorable, suitable for _____ steam (export) _____ steam (on-site) _____ synthetic fuels (on-site)

Production Prospects 1994: Uncertain (Favorable, if issued and integrated into existing LMUs.) Production timing woul depend on mining sequence of Jacobs Ranch and Black Thunder Mines.

COMMENTS:

The two leases in this block are each divided into two non-contiguous units, all of which are adjacent to either Kerr McGee's Jacobs Ranch Mine or ARCO's Black Thunder mine. This creates a confusing situation in which each PRLA is associated with two separate mines. The association with existing mines would create favorable prospects for development, except that USGS files do not provide written proof that information demonstrating commercial quantities had been provided by the applicant during the terms of the permit. PRLA W16876 contains one mining claim and may have high wildlife values (USDI 1978b). If the PRLAs are granted, prospects for development are favorable.

PRLA Block Name: Peabody (P3) Map Ref. No. P15 (Map 1.7)

Owner/ Parent Co. Peabody Coal Co.

County: Campbell
State: WY

Location: T42N R69W
AMS Sheet Newcastle
7.5' Quad Piny Canyon SW

LEASE DATA

Lease Number	Acres	Reserves	Btu/lb.	Sulfur		Ash	Seam thick.	Overburden thick.	ratio
		M Tons		%	#M Btu	(%)	(ft.)	(ft.-ave.)	
W25717	200	ACLDS	-	-	-	-	>20		
W25718	160		-	-	-	-	>20		
W32064	1560		-	-	-	-	>20		
W32065	280		-	-	-	-	>20		
			8448	0.32	0.38	5.6	>20	0-200	<2.0
Total/ Average	2200	>30							

Coal quality data from USGS, Casper

APPLICATION OF SCREENS

Primary Screens								Secondary Screens (+ favorable - unfavorable)						PRLAs		
LMU	Res.	Btu	S	Ash	Seam Thick.	Overburden Thick.	Overburden Ratio	Own.	Act.	Tran.	Geo.	Env.	Leg.	Clms.	LMU.	Irr.
yes	yes	yes	yes	yes	yes	yes	yes	+	-	+	+	+	+	+	+	-

Development Prospects: Uncertain If favorable, suitable for yes steam (export)
____ steam (on-site) ____ synthetic fuels (on-site)

Production Prospects 1994: Uncertain (Favorable if issued and combined with existing LMU.) Production timing would depend on mining sequence of the Rochelle Mine.

COMMENTS:

This block passes all the primary screens, and in addition is adjacent to Peabody's Rochelle lease. All four permits have mapped coal beds within their boundaries and one has a measured section (Dobbins and Barnett 1927), and consequently the applications may be subject to challenge on the basis that the original permits were improperly issued by the Department of Interior. Development prospects are uncertain for this reason. Reserves are marginal for development of a new mine, but if the leases are issued, the block has favorable prospects for development if it is integrated into the Rochelle LMU.

PRLA Block Name: North Antelope (1)
Map Ref. No. P16 (Map 1.7)

Owner/Parent Co. North Antelope Coal Co. (Peabody and Panhandle Eastern)
County: Campbell
State: WY
Location: T41N R70W
AMS Sheet Newcastle
7.5' Quad Teckla
Piney Canyon SW

LEASE DATA

Lease Number	Acres	Reserves M Tons	Btu/lb.	Sulfur %	Sulfur #M Btu	Ash (%)	Seam thick. (ft.)	Overburden thick. (ft.-ave.)	Overburden ratio
W32068	120	ACLDS	-	-	-	-	> 20		
W60638	120		-	-	-	-	> 20		
			8448	0.32	0.38	5.6	> 20	0-200	< 2.0
Total/ Average	240	< 30	Coal quality data from USGS, Casper						

APPLICATION OF SCREENS

Primary Screens								Secondary Screens (+ favorable - unfavorable)						PRLAs		
LMU	Res.	Btu	S	Ash	Seam Thick.	Overburden Thick.	Overburden Ratio	Own.	Act.	Tran.	Geo.	Env.	Leg.	Clms.	LMU.	Irr.
yes	yes	yes	yes	yes	yes	yes	yes							+	+	+

Development Prospects: Favorable, if integrated into existing LMU.

If favorable, suitable for _____ steam (export) _____ steam (on-site) _____ synthetic fuels (on-site)

Production Prospects

1994: Production timing depends on mining sequence of N. Antelope or Rochelle Mine

COMMENTS:

These PRLAs are not continguous to the North Antelope lease, but they are contiguous to parts of the Rochelle lease that may be developed as part of the North Antelope mine. Since Peabody controls both the North Antelope, Rochelle leases and the PRLA, chances are good that the PRLAs would be integrated into one or the other logical mining unit.

PRLA Block Name: North Antelope (2)   Map Ref. No. P17 (Map 1.7)

Owner/Parent Co.: North Antelope Coal Co. (Peabody and Panhandle Eastern)

County: Campbell Converse

State: WY

Location: T41N R70W

AMS Sheet: Newcastle

7.5' Quad: Teckla, Piney Canyon SW, Betty Reservoir (15')

LEASE DATA

Lease Number	Acres	Reserves	Btu/lb.	Sulfur		Ash	Seam thick.	Overburden thick.	ratio
		M Tons		%	#M Btu	(%)	(ft.)	(ft.-ave.)	
W25719	1160		-	-	-	-	>20		
W32067	80		-	-	-	-	>20		
Total/ Average	1240	<30							

APPLICATION OF SCREENS

Primary Screens								Secondary Screens (+ favorable - unfavorable)						PRLAs		
					Seam	Overburden										
LMU	Res.	Btu	S	Ash	Thick.	Thick.	Ratio	Own.	Act.	Tran.	Geo.	Env.	Leg.	Clms.	LMU.	Irr.
no	no	-	-	-	yes	-	-							+	-	-

Development Prospects: Unfavorable   If favorable, suitable for _____ steam (export)

OTA Follow-up: Uncertain   _____ steam (on-site) _____ synthetic fuels (on-site)

Production Prospects -   1994: Unfavorable

OTA Follow-up: Uncertain (Favorable is issued and integrated into existing LMU). Production timing would depend on mining sequence of Antelope Mine.

COMMENTS:

This PRLA block is separated from the North Antelope lease by about three sections of unleased federal coal, so the block cannot be considered an LMU, since it does not have sufficient reserves by itself. Another factor working against the PRLA is that Dobbins and Barnett (1927) show coal outcrops within the tract, indicating that the original prospecting permit may have been improperly issued.

According to the U.S. Forest Service, which administers the surface, one of the better riparian areas in the district is along Antelope ad Porcupine Creek. These areas would not be directly affected by development of the PRLAs but associated human activity might be a problem. The PRLAs have high wildlife values (USDI 1978b).

OTA follow-up found that this PRLA could possibly be developed if it was integrated into NERCO's Antelope Mine which adjoins the west boundary of the LMU, and consequently development and production prospects were changed to uncertain, with production contingent on lease issuance and integration into Antelope Mine.

PRLS Block Name: Peabody (P4) (South Antelope) Map Ref. No. P18 (Map 1.7)

Owner/
Parent Co. Peabody Coal Co.

County: Converse
State: WY

Location: T40N R70W
AMS Sheet Newcastle
7.5' Quad Betty Reservoir (15')

LEASE DATA

Lease Number	Acres	Reserves M Tons	Btu/lb.	Sulfur %	Sulfur #M Btu	Ash (%)	Seam thick. (ft.)	Overburden thick. (ft.-ave.)	Overburden ratio
W32506	835	>30	-	-	-	-	>20		
			8738	0.39	0.45	7.1	>20		>3.5
Total/ Average									

Coal quality data from USGS, Casper.

APPLICATION OF SCREENS

Primary Screens								Secondary Screens (+ favorable - unfavorable)						PRLAs		
LMU	Res.	Btu	S	Ash	Seam Thick.	Overburden Thick.	Overburden Ratio	Own.	Act.	Tran.	Geo.	Env.	Leg.	Clms.	LMU.	Irr.
yes	yes	yes	yes	yes	yes		no							+	na	-

Development Prospects: Uncertain If favorable, suitable for no steam (export)
poss steam (on-site) no synthetic fuels (on-site)

Production Prospects 1994: Uncertain, if issued

COMMENTS:

This block meets quality criteria for export, but the strip ratio is too high. USGS data indicates that an associated state lease has 22.4 million tons, which combined with federal reserves, would be sufficient to supply onsite conversion for a power plant, but not sufficient for a synthetic fuels. Dobbins and Barnett (1927) indicate the presence of about three miles of coal outcrop within the block, so the original prospecting permit may have been improperly issued by the Department of Interior.

The lease has uncertain development prospects because of possible irregularities in the permit issuance. Production prospects are uncertain even if the lease is issued because of the high strip ratio.

PRLA Block Name: Peabody (P5) (Dull Center) Map Ref. No. P19 (Map 1.7)

Owner/
Parent Co.

County: Converse
State: WY

Location: T39N R69W
AMS Sheet Newcastle
7.5' Quad Coal Bank Draw, Fiddleback Ranch, Tin Can Lake, Piney Canyon SE

LEASE DATA

Lease Number	Acres	Reserves M Tons	Btu/lb.	Sulfur %	Sulfur #M Btu	Ash (%)	Seam thick. (ft.)	Overburden thick. (ft.-ave.)	ratio
W916	3318		-	-	-	-	< 20		
W917	320		-	-	-	-	<20		
Total/ Average	3628	< 30							

APPLICATION OF SCREENS

Primary Screens								Secondary Screens (+ favorable - unfavorable)						PRLAs		
						Overburden										
LMU	Res.	Btu	S	Ash	Seam Thick.	Thick.	Ratio	Own.	Act.	Tran.	Geo.	Env.	Leg.	Clms.	LMU.	Irr.
no	no	-	-	-	no									-	-	-

Development Prospects: Unfavorable If favorable, suitable for _____ steam (export) _____ steam (on-site) _____ synthetic fuels (on-site)

Production Prospects 1994: Unfavorable

COMMENTS: This block has unfavorable development prospects for several reasons. It does not meet the reserves or seam thickness criteria, and the block is surrounded by unleased federal coal, so non-federal reserves are not available to increase the reserve base.

The block contains 18 mining claims and Hausel et al (1979) show a uranium occurrence within the boundaries of the tract. Initial showing and supplemental data provided under 43CFR 3930 have been reviewed and found satisfactory by USGS (letter to BLM dated June 2, 1980). However, Dobbins and Barnett (1927) mapped about five miles of coal outcrop and measured five sections within the tract boundaries, so the original prospecting permit may have been improperly issued by the Department of Interior. The two PRLAs may have high wildlife values USDI (1978b).

These PRLAs are being processed for the 1984 lease sale.

PRLA Block Name: Western Fuels (1) (Stevens North) Map Ref. No. P20 (Map 1.8)

Owner/ Parent Co. Western Fuels Association

County: Converse
State: WY

Location: T37N R74W
AMS Sheet Newcastle
7.5' Quad Ross, Coal Draw, Fifty-Five Ranch Highland Flats

LEASE DATA

Lease Number	Acres	Reserves	Btu/lb.	Sulfur		Ash	Seam thick.	Overburden thick.	ratio
		M Tons		%	#M Btu	(%)	(ft.)	(ft.-ave.)	
W12767	1281								
W14390	3928								
W14392	3655		7831	0.51	0.65	7.7	< 20		> 3.5
Total/ Average	8864	< 180							

Coal quality data from USGS, Casper.

APPLICATION OF SCREENS

Primary Screens								Secondary Screens (+ favorable - unfavorable)						PRLAs		
					Seam	Overburden										
LMU	Res.	Btu	S	Ash	Thick.	Thick.	Ratio	Own.	Act.	Tran.	Geo.	Env.	Leg.	Clms.	LMU.	Irr.
no	no	no	yes	yes	no	--	no							-	na	-

Development Prospects: Unfavorable If favorable, suitable for ____ steam (export)
. OTA Follow-up: Uncertain ____ steam (on-site) ____ synthetic fuels (on-site)

Production Prospects

1994: Unfavorable
OTA Follow-up: Uncertain (favorable if issued and integrated into Dave Johnston Mine)

COMMENTS:

Low heat content indicates this block would need to be developed onsite and reserve data in ACLDS indicates that this block could support an onsite power or synfuels plant. This block is listed as a proposed mine in Rich (1978) which would supply coal for Laramie River Power Plant. However, USGS data indicates that the reserve figures in ACLDS probably include a significant amount of reserves with a stripping ratio greater than 10:1, and it appears that reserves with a stripping ratio of less than 3.5 are probably less than 30 million tons. Two state sections and about a section of private coal in smaller parcels are contiguous to the block which could increase reserves slightly, but the thin seam thickness and apparently high stripping ratios give this block unfavorable development prospects.

Development prospects for this block are further clouded by the fact that it is covered by Kerr McGee Uranium claims, and a review by USGS of the initial showing and supplemental information required under 43 CFR 3430 has found deficiencies (letter to BLM June 3, 1980). The northern part of the block has a small oil field. PRLA W12767 may have high wildlife values (USDI 1978b) and Wyoming Game and Fish Department (1979) shows the block to be partly covered by critical upland game bird habitat.

OTA follow-up concluded that there is a remote possibility that this block could be developed as a northward extension of the Dave Johnston Mine, if the Phillips Creek(1) lease block is integrated into the mine, and consequently development and production prospects were changed to uncertain.

PRLS Block Name: Western Fuels (2) (Stevens South) Map Ref. No. P21 (Map 1.8)

Owner/ Parent Co. Western Fuels Association

County: Converse

State: WY

Location: T36N R74W

AMS Sheet Newcastle

7.5' Quad Fifty-five Ranch
Highland Flats

LEASE DATA

Lease Number	Acres	Reserves M Tons	Btu/lb.	Sulfur %	Sulfur #M Btu	Ash (%)	Seam thick. (ft.)	Overburden thick. (ft.-ave.)	ratio
W14355	4352	no surface reserves	-	-	-	-	-		
Total/ Average									

APPLICATION OF SCREENS

Primary Screens								Secondary Screens (+ favorable - unfavorable)						PRLAs		
					Seam	Overburden										
LMU	Res.	Btu	S	Ash	Thick.	Thick.	Ratio	Own.	Act.	Tran.	Geo.	Env.	Leg.	Clms.	LMU.	Irr.
no	no	-	-	-	-	-	-							-	-	-

Development Prospects: Unfavorable If favorable, suitable for ____ steam (export) ____ steam (on-site) ____ synthetic fuels (on-site)

Production Prospects 1994: Unfavorable

COMMENTS:

This has unfavorable development prospects because according to ACLDS the block has only underground reserves. In addition, the block is covered by Kerr-McGee uranium claims, and USGS has found the initial showing to be deficient. The block may have high wildlife values (USDI 1978b). OTA follow-up found that there is a remote possibility that this PRLA could be developed for in-situ gasification, but not enough to justify changing the ratings.

PRLA Block Name: Dixie (1) • Map Ref. No. P22 (Map 1.8)

Owner/
Parent Co. Dixie Natural Resources

County: Converse
State: WY

Location: T36N R75W
AMS Sheet Fifty-Five Ranch
7.5' Quad

LEASE DATA

Lease Number	Acres	Reserves M Tons	Btu/lb.	Sulfur %	Sulfur #M Btu	Ash (%)	Seam thick. (ft.)	Overburden thick. (ft.-ave.)	ratio
W21515	800	no surface reserves							
Total/ Average									

APPLICATION OF SCREENS

Primary Screens								Secondary Screens (+ favorable - unfavorable)						PRLAs		
						Overburden										
LMU	Res.	Btu	S	Ash	Seam Thick.	Thick.	Ratio	Own.	Act.	Tran.	Geo.	Env.	Leg.	Clms.	LMU.	Irr.
no	no	-	-	-	-	-	-							-	-	+

Development Prospects: Unfavorable If favorable, suitable for _____ steam (export) _____ steam (on-site) _____ synthetic fuels (on-site)

Production Prospects 1994: Unfavorable

COMMENTS:

This block has no surface minable reserves according to ACLDS so it has unfavorable development prospects. It has about a section of private coal associated with the block, and could be combined with Western Fuels (2) PRLA block but this has only underground reserves too. The block is covered by 66 uranium claims held by Kerr-McGee.

PRLS Block Name: Dixie (2)
Map Ref. No. P23 (Map 1.8)

Owner/ Parent Co. Dixie Natural Resources
County: Converse
State: WY
Location: T36N R75W
AMS Sheet Newcastle
7.5' Quad Fifty-Five Ranch
Hylton Ranch

LEASE DATA

Lease Number	Acres	Reserves	Btu/lb.	Sulfur		Ash	Seam thick.	Overburden thick.	ratio
		M Tons		%	#M Btu	(%)	(ft.)	(ft.-ave.)	
W21516	2276	>30	-	-	-	-	<20		
			7500						
Total/ Average									

Heat content projected from Dave Johnston Mine.

APPLICATION OF SCREENS

Primary Screens								Secondary Screens (+ favorable - unfavorable)						PRLAs		
					Seam	Overburden										
LMU	Res.	Btu	S	Ash	Thick.	Thick.	Ratio	Own.	Act.	Tran.	Geo.	Env.	Leg.	Clms.	LMU.	Irr.
no	no	no	-	-	no	-	-							-	-	+

Development Prospects: Uncertain
If favorable, suitable for ____ steam (export)
____ steam (on-site) ____ synthetic fuels (on-site)

Production Prospects 1994: Uncertain, if issued

COMMENTS:

This block has more than 30 million tons reserves, but seams are thin and heat content is low. The block is also covered by 239 uranium claims.

This PRLA was initially judged by OTA to have unfavorable development prospects because of small reserves, thin seams and low heat content. However, the Task Force changed this to uncertain because Pioneer Nuclear (now Texas Eastern Nuclear), who assigned the PRLA to Dixie Natural Resources with the understanding that they would develop a mining plan, still wants to develop the lease, possibly to provide energy for a uranium milling operation. If the PRLA is issued, production prospects are uncertain because of the marginal nature of the lease.

PRLA SUMMARY SHEET OF KEMMERER BLOCKS, SOUTHERN CARBON COUNTY, WYOMING

Block Name/PRLA Number	Map No.	Reserves [1/]	Initial Showing	Abandoned Mines	Critical Habitat (amount on block)			Rare Species and Communities
					Elk	Mule Deer	Sage Grouse	
Kemmerer (1) W0324041	P24	< 30	No	No	half	none	half	Flannel mouth sucker adjacent to block, Colorado cutthroat trout upstream.
Kemmerer (2) W0324037	P25	none	Yes	No	all	some	none	-
Kemmerer (3) W0324035	P26	< 30	No	Yes	all	some	most	Gamble Oak - Tall Shrubland community adjacent to lease
Kemmerer (4) W0324038	P27	< 30	Yes	Yes	all	most	some	Red Hawthorne within block Bluehead sucker adjacent
Kemmerer (5) W0324034 W0324036	P28	< 30	Yes No	No No	some	half	all	Bluehead sucker adjacent
Kemmerer (6) [3/] W0324042	P29	none	Yes	No	some	half	most	-

Footnotes:

[1/] All the blocks meet seam thickness criteria (greater than 5 feet). No coal quality data available.

[2/] Yes, indicates written approval by USGS.

[3/] Block has one mining claim, but probably doesn't cover a large enough area to adversely affect the application.

Other sources of information: Critical Habitat (Wyoming Game and Fish Department 1979), Rare Species (Wyoming Natural Heritage Program 1980) Abandoned Mines (Hausel, et al 1979)

PREFERENCE RIGHT LEASE APPLICATION BLOCK SUMMARY SHEET

PRLA BLOCK NAME: Kemmerer (1) to (6)   Map Ref. No. P24-P29 (Map 2.2)

Owner/Parent Co: Kemmerer Coal Co.

Kemmerer Coal Company holds seven preference right lease applications covering 29,291 acres in the Little Snake River coal field near Savery in Carbon County. Because of the large acreages covered by these applications they were divided into six blocks. The development potential of these blocks is affected by a complex set of issues which are common to most of the blocks so they are discussed as a group with individual differences summarized in a single table.

All the reserves in the area appear to require underground mining, and none of the blocks meet the minimum reserve criteria. This is the major reason the blocks are considered to have unfavorable development potential. In addition, there appears to be high potential for conflicts with environmental values if the blocks are developed and a number of procedural irregularities are associated with the blocks. All the blocks are almost completely covered by critical habitat for elk, mule deer, and sage grouse (Wyoming Game and Fish Department 1979). Just upstream from the Kemmerer(1) block in Big Sandstone Creek are capture locations for the rare Colorado Cutthrcat Tr (Ecology Consultants, Inc. 1978). Other rare species and plant communities in the area include: Bluehead Sucker and Flannelmouth Sucker (fish), Red Hawthorne plant) and the Gamble Oak-Tall Shrubland plant community (Wyoming Natural Heritage Program 1980). The fact that all leases would involve underground mining makes terrestrial wildlife impacts less critical, but impacts of mining on aquatic habitat could be a significant concern. Since the area is not extensively developed at the present time, secondary impacts form population influx could be a significant concern.

A letter from USGS to Kemmerer Coal Company dated June 1, 1979, indicates that there are deficiencies in the initial showings for all the PRLAs. The situation is complicated by the fact that USGS has made earlier findings that four of the seven PRLAs had commercial quantities. Two of these applications with "proven quantities" apparently have no reserves at all (USDI 1978b). In addition, two of the blocks (Kemmerer 3 and 4) have abandoned underground mine workings (Hausel et. al. 1979) and the prospecting permits may have been improperly issued in the first place.

The whole area is located more than 40 miles from the Union Pacific railroad line, and the marginal nature of the reserves in these blocks would probably not justify construction of a rail line. Plans to develop the Baggs Uranium District might provide additional incentive to build a line, but there are not plans to construct such a line at the present time.

The combination of low reserves, distance from existing rail lines, environmental considerations and procedural irregularities with respect to granting of prospecting permits and in the initial showing indicate unfavorable development and production prospects for all the six blocks.

PRLS Block Name: Rosebud

Map Ref. No. P30 (Map 3.1)

Owner/ Parent Co. Rosebud Coal Sales

County: Sweetwater

State: WY

Location: T22N R103W

AMS Sheet Rock Springs

7.5' Quad Boars Tusk (15')

LEASE DATA

Lease Number	Acres	Reserves	Btu/lb.	Sulfur		Ash	Seam thick.	Overburden thick.	ratio
		M Tons		%	#M Btu	(%)	(ft.)	(ft.-ave.)	
WO 308922	795	none	-	-	-	-	-		
WO 3089923	2233	< 30 underground reserves	-	-	-	-	> 8		
Total/ Average	3028								

APPLICATION OF SCREENS

Primary Screens								Secondary Screens						PRLAs		
						Overburden		(+ favorable - unfavorable)								
LMU	Res.	Btu	S	Ash	Seam Thick.	Thick.	Ratio	Own.	Act.	Tran.	Geo.	Env.	Leg.	Clms.	LMU.	Irr.
no	no	-	-	-	yes											

Development Prospects: Unfavorable If favorable, suitable for _____ steam (export) _____ steam (on-site) _____ synthetic fuels (on-site)

Production Prospects 1994: Unfavorable

COMMENTS:

This block does not have sufficient reserves (lease WO 308922 has no reserves) to make a viable mine by itself even when checkerboarded railroad coal is taken into consideration. The block is adjacent to the proposed Long Canyon Mine, and it is possible that it could be integrated into the LMU, by assigment to Sunedco. However, the minable seams are deeper than 1500 feet and it is not likely that Sunedco would be interested in the block.

The surface of the block is mostly covered by critical habitat for antelope and mule deer (Wyoming Game and Fish Department 1979) and the block is rated to have high wildlife values by USDI (1978b).

PRLA Block Name: Salt Wells Map Ref. No. P31 (Map 3.1)

Owner/
Parent Co. Peabody Coal Co.

County: Sweetwater
State: WY

Location: T17N R101W
AMS Sheet Rocksprings
7.5' Quad Cooper Ridge NE

LEASE DATA

Lease Number	Acres	Reserves	Btu/lb.	Sulfur		Ash	Seam thick.	Overburden thick.	ratio
		M Tons		%	#M Btu	(%)	(ft.)	(ft.-ave.)	
W16431	2880	no reserves	-	-	-	-	<5		
Total/ Average									

APPLICATION OF SCREENS

Primary Screens								Secondary Screens						PRLAs		
					Seam	Overburden		(+ favorable - unfavorable)								
LMU	Res.	Btu	S	Ash	Thick.	Thick.	Ratio	Own.	Act.	Tran.	Geo.	Env.	Leg.	Clms.	LMU.	Irr.
no	no	-	-	-	no									+	-	-

Development Prospects: Unfavorable If favorable, suitable for ____ steam (export)
____ steam (on-site) ____ synthetic fuels (on-site)

Production Prospects 1994: Unfavorable

COMMENTS:

The block is checkerboarded with non-federal coal and is located within the boundaries of Rocky Mountain Energy Company's proposed Salt Wells Mine, but this mine is not being actively promoted by the company. The block is mostly covered by critical upland game bird habitat and is crossed by antelope migration routes (Wyoming Game and Fish Department, 1979). The block has no reserves and the initial showing was not filed on time (USDI 1978b). The block has unfavorable development and production prospects.

PRLA
UNDEVELOPED LEASE BLOCK SUMMARY SHEET

Lease Block Name: Bean Springs

Map Ref. No. P32 (Map 3.1)

Owner/ Parent Co. Ark Land Co.

County: Sweetwater

State: WY

Location: T14N R103W

AMS Sheet Rock Springs

7.5' Quad Titsworth Gap
Potter Mt.

LEASE DATA

Lease Number	Acres	Reserves M Tons	Btu/lb.	Sulfur %	Sulfur #M Btu	Ash (%)	Seam thick. (ft.)	Overburden thick. (ft.-ave.)	ratio
W19187	2240								
W19188	2560								
W19189	2029								
W19190	1373						>20		
Total/ Average		>30 (surface and underground combined)							

APPLICATION OF SCREENS

Primary Screens								Secondary Screens (+ favorable - unfavorable)						PRLAs		
LMU	Res.	Btu	S	Ash	Seam Thick.	Overburden Thick.	Overburden Ratio	Own.	Act.	Tran.	Geo.	Env.	Leg.	Clms.	LMU.	Irr.
yes	yes	-	-	-	yes			+	+	-	+	-	+	+	na	

Development Prospects: Favorable If favorable, suitable for yes steam (export)
_____ steam (on-site) _____ synthetic fuels (on-site)

Production Prospects 1994: Uncertain

COMMENTS:

This block has approximately 2500 acres of state coal associated with it which probab increase reserves considerably. The 1979 Wyoming Mineral Map shows about half the block having known thick or abundant coal deposits, and recent review of the PRLA by USGS indicates it has good development potential.

The block is located about 30 miles from the Union Pacific Railroad which works against favorable prospects for production in the near future. The western edge of the block has critical upland game bird habitat, and it lies at the eastern edge of an area of critical mule deer habitat, with a migration route crossing the block (Wyoming Game and Fish Department 1979). The Red Creek Badlands Wilderness study area lies just a few miles to the south. BLM's initial review of wilderness inventory units selected this area for further study as a possible wilderness area. Salt Wells Creek, a perennial stream, runs through the block and alluvial valley floor might be affected by mining.

The block is listed as a proposed mine by ICF (1980), but the PRLA was judged to have uncertain development prospects due primarily to distance from existing transportation networks.

APPENDIX 3. SUPPLEMENTAL DATA FOR WYOMING

This appendix summarizes the data that was used by OTA to develop the geotechnical screening criteria and estimates of potential production capacity from existing and proposed mines in the Wyoming Powder River Basin and Southern Wyoming. Also included is a more detailed compilation of production and demand projections that were reviewed by OTA in its market analysis.

Table A.3.1	Production Capacity and Reserves, Existing and Proposed Mines in the Powder River Basin, Wyoming*
Table A.3.2	Production Capacity and Reserves, Existing and Proposed Mines in Southern Wyoming
Table A.3.3	Geotechnical Data, Developed Federal Leases in the Powder River Basin, Wyoming
Table A.3.4	Geotechnical Data, Developed Federal Leases in Southern Wyoming
Table A.3.5	Detailed Demand/Production Projections for Powder River Basin
Table A.3.6	Detailed Demand/Production Projections for Southern Wyoming

*Note that several additional sources not listed in this Table were used to develop Table 6.7 in Chapter 6: Coal Age, 1981, DOE 1979 and 1981 (see Table 6.7 for full citations).

Table A.3.1 Production Capacity and Reserves, Existing and Proposed Mines Powder River Basin, Wyoming

Mine Name	Max Capacity	Air Permit (9)	Contracted (1) MTPY	Contracted (1) Total	Mine Capacity	Reserves
Developed Federal Leases						
Buckskin	6	6	6.15	80	6.15(1) 4.0(3,4,7)	80(1) 84(7,10) 100(4)
North Rawhide	24	24	7.8	210	8.5(3,6) 12.0(1,2,4,7, 10,13,15)	170(6) 350(4) 380(15) 600(1,2) 354rec., 752 total (8,10)
Eagle Butte	29	29	37.1	448	15(13),20(2,4,7,10) 30(3)	560(10) 566.2(2) 1,016(1)
Belle Ayre	25	25			15(3,6) 19.9(5) 20(2,4,7,10,13)	300(5) 315(6) 331(2,10) 356.6(15)
Wyodak	5	5	5	50	0.86(2), 2.2(3,6) 2.5(7) 5(1,10)	50(1,2) 160(5) 66(6) 169.4+(8), 180(5) 183(15)
Caballo	12	12	3.9	85.2	5.0(13) 12(1,2,3,4, 7,10)	360(2) 403(10) 460(1) 463 (Caballo EIS)
Pronghorn*	5	5	-	-	5 (2,3,7,10,13)	100(10), 110(2)
Rojo Caballos	15	15	2.6	50	15(1)	317.5(1, Rojo Caballos EIS)
Cordero	24	24	10.4	217.3	12(3,4,6,13) 24 (1,2, 7,15)	>150(4) 337 proven 521 est (2) 360(6) 516(1) 523(15)
Coal Creek	18	18	4.0	80	10(1,2,7,10,13)	330(2, Coal Creek EIS) 333(1,10)

NOTE: Numbers in ( ) refer to data sources.

*This lease will be mined in conjunction with Rojo Caballos.

Table A.3.1 cont'd

Mine Name	Max Capacity	Air Permit (9)	Contracted (1)		Mine Capacity (MTPY)	Reserves (MT)
			MTPY	TOTAL		
Jacobs Ranch	16	16	13.2	322.7	14(1,3), 15(2,10) 16(4,13) 16.3(15)	298(8) 300(4) 305(10,15) 308(6) 319(1) 331(2)
Black Thunder	20.5	20.5	16.8	374	10(6) 20(1,2,4,7,10, 13,15)	400(6) 720(10) 724(2,8) 725(4) 750(1) 720rec 760 total (15)
Dave Johnston	3.3	--	3.3	125	3.2(7,10,15)3.23(6) 3.3(1,2,4)	>50(4) 97.6(15) 100(10) 113(6) 125(1,2) 150(5)
Producing NonFederal Mines						
Black Mountain	0.1		-	-	0.096(2)	1.8(1,2)
Bighorn No. 1	4.6	4.6	2.2-2.8	28 (est)	1.5 (3,6,13) 2.4(12) 2.5(2) 2.8(1) 3.0(4)	>16(2) 22.5(6) 28(1)
Clovis	4.0	4.0	4.0	15	4.2(7) 4.5(1)	68(1)
Fort Union	1.2	5.0	-	-	1.2(1)	13.8(1)
Undeveloped Federal Leases						
Lake DeSmet	20+	--	--	--	20(11)	2,000(1) 3,000(11)
Belco	7	--	--	--	--	--
Wildcat	10	10	--	--	10(9,10) 15(12,13)	--
Dry Fork	15	15	--	--	10(3)	--
South Rawhide	7(12)*	7	--	--	10(10)	--

*Leases planned capacity in 1991.

Table A.3.1 cont'd

Mine Name	Max Capacity	Air Permit (9)	Contracted (1) MTPY	Contracted (1) Total	Mine Capacity	Reserves
North Rochelle	6	--	--	--	--	--
Rochelle	11	--	--	200	11(1,3,4,7,10,13)	200(1) 606(10)
North Antelope	5	5	5	150	5(1,4,10)	150(4) 200(1) 229(10)
Antelope	10	--	0.8	15.7	10(1,10)	225(1) 300(10)
E. Gillette Federal	11	11	--	--	11(3,4,7,10) 12(2,4) 15.5(13)	348(10 390(2)
Thunderbird (PRLA) 1/	(5)	--	--	--	5.0 (12,13) ?(14)	
Stevens North 1/ (Western Fuels (1) PRLA)	(5)	--	--	--	5(3)	
Non-federal Proposed Mines						
Welch No. 1	1.0	--	--	--	1.0(1,2) ?(2,14)	
Whitney	1.0	--	--	--	1.0(1,3) ?(14)	
PSO No. 1	0.5	--	--	--	0.5(1,3,4) ?(14)	15(1) 37(4)
Dutchman(Thornbury)	2.0	2.0	--	--	0.25(4) 0.2(13)	
WYMO	4.0	4.0	--	42	4(1) 10(10) ?(14)	42(1), w/unleased federal coal 260(10)
Norfolk	--	--	--	--	? (1,12)	
Falcon	--	--	--	--	?(12,13)	

1/ Rated by Task Force as having unfavorable development and production prospects.

Table A.3.1 cont'd

Data Sources:

(1) Glass (1980)
(2) Lane and Miller (1978)
(3) Rich (1978)
(4) Western Coal Planning Assistance Project (1979)
(5) EPA (1978)
(6) Kelly (1979)
(7) E PRB EIS - BLM (1979b)
(8) E PRB EIS - BLM (1974)
(9) DEQ Permits as of August 1980
(10) USGS unpublished data, Casper
(11) BLM (1979a)
(12) Hausel et. al. (1979)
(13) Morris (1978)
(14) ICF (1980)
(15) Dames and Moore (1980)

TABLE A.3.2 Production Capacity and Reserves, Existing and Proposed Mines, Southern Wyoming

Mine Name	Max Capacity	Contracted MTPY	Contracted Total	(1) Mine Capacity (MTPY)	Reserves (MT)
Developed Federal Leases					
Carbon County	2.5	1.5	104	1.5(1,8) 2.0(3) 2.2(9) 2.5(5,6,7,10) 4.6(12)	287(1) 127.5(12)
Rosebud	3.0	3.0	36.4	2.0(3,9,12) 2.3(8) 2.5 (2,7,10) 3.0(1)	24(2) 36.4(1,12) 21.5(5)1/
Seminoe No. 2	3.5	3.0	39.5	2.5(8) 3.0(1,7,10) 3.5 (3,5,9) 4.0-9.0(12)	39.5(1) 60(2) 69.05 fed, 229.5 total(12) 34.5(5) 1/
Medicine Bow	3.6	3.0	37.5	2.0-3.0(2) 2.5(3,9) 3.0 (7,9,10,12) 33(1) 3.6(5)	22.8(12) 25(2) 37.5(1) 94.9(5)1/
Vanguard No. 2	2.5	1.5	21.0	1.0(7) 1.2(8) 1.3(3,9, 12) 1.7(10) 2.0(1) 2.5 (6)	21(1) 10-20(2) 20.4(12) 2/
Seminoe No. 1	3.0	2.5 3/	32.2	2.0(8) 2.3(3,9) 3.0(1,7, 10) 4.6(12)	32.2(1) 57.1(12) 4/ 66(2)
Stansbury	1.4	0.63	59	0.3(1) 0.5(8) 1.0(4,10) 1.2(2,5,9,12) 1.4(6)	19(4) 59 w Winton(1) 89.3 (12) 90-107(2)
Jim Bridger	7.5	7.15	250	7.0(12) 7.2(9) 7.5(1, 4,8,10)	89.5 Fed only(12) 140(2) 210(4) 250(1)

1/ Proposed new leasing

2/ Energy Development Co. has the right to mine reserves below 200 feet.

3/ Dames & Moore (1980) indicated contracted production of 4.7 mtpy.

4/ Includes 34.6 million tons of underground reserves for which there are no current plans to mine.

NOTE: Numbers in ( ) refer to data sources.

Table A.3.2 (continued)

Mine Name	Max Capacity	Contracted (1) MTPY	Contracted (1) Total	Mine Capacity	Reserves
Black Butte	7.0	6.0	141.4	4.2(5) 6.0(10) 6.3(4, 8,9) 7.0(1)	146(1,4) 29.5 UG reserves no plan to mine, 300 million to 200 ft (4)
Elkol-Sorenson	6.0	4.27	100+	3.5(4,9) 4.3(1) 4.4 (8) 5.0(10) 5.8(6) 6.0(2)	56.3(12) 83(4) 250(2) 300(1)
Skull Point	2.0	0.75	14	1.2(4,8,9) 1.5(1) 1.8(2,10) 2.0(5)	27(4) 36(1,2)
Carbon Basin (new lease)	5.0	5.0	250	5.0(1,7,10)	400(1)
Undeveloped Federal Leases					
Hanna South	0.6	0.6	6.1	0.6(1,3,8,9) 0.8(7)	6.1(1,3)
Cherokee	6.0	-	-	5.0(3,8,9) 6.0(5,6,10)	250(3)
Long Canyon	2.0	-	-	2.0(4,5,8,9,10)	63(4)
North Block	1.4	(1.4)	(54)	1.4(1,4,8,9,10)	54(4) 100(1)
Twin Creek	3.0	-	-	25(4,5,9) 3.0(6,10)	
South Haystack	3.0	-	-	3.0(3,5,6,8,10)	54(4)

Table A.3.2 (continued)

Mine Name	Max Capacity	Contracted (1) MTPY	Contracted (1) Total	Mine Capacity	Reserves	Cum. Prod.
Non-Federal Mines						
Prospect Point (Leucite Hills South)		0.325		0.5(1,10) ?(11)	5.1(1)	
Winton				2.0(4,10) ?(11)	40(4)	
Reliance				0.5(4,10)	9(4)	
Grass Creek		0.005		0.7(1,10)	10(2,1)	
Muddy Creek				0.1(1) 0.6(10)	0.3(1)	
Roncco				neg.(1)		

Data Sources:
(1) Glass (1980)
(2) Lane and Miller (1978)
(3) SC WY EIS - BLM (1978a)
(4) SW WY EIS - BLM (1978b)
(5) Green River Hams Fort EIS BLM (1980b)
(6) Rich (1978)
(7) Glass and Roberts (1979)
(8) USDI estimates 11/14/79
(9) USDI estimates 6/6/80
(10) Hausel (1979)
(11) ICF (1980)
(12) Dames & Moore (1980)

TABLE A.3.3 Geotechnical Data: Developed Federal Leases in the Powder River Basin, Wyoming

Mine Name	Seam Thickness (ft)	Heat Content (Btu/lb)	Sulfur (lbs/10^6Btu)	Ash (%)	Overburden (feet)	Strip Ratio
Buckskin	100(1)	8,200(1)	0.62(8)	6.0(1) 6.1(8)	101 ave. (6, 8)	1.0(5)
	104(5,6,8)	8,183(8)			20-215(5, 6,8)	
N. Rawhide	104(1) 108(3) 107(4,5) 116(15) 110(7)	8050(1,3) 7880-8,170(4) 8063(7)	0.5(1,3) 0.32-1.05(4) 0.47(7)	6.0(1,3,7) 4.7-8.4(4)	118 ave.(3) 10-212(4,6)	1.0(3) 1.0 mine block area, 1. remainder of lease (7)
Eagle Butte	100±(1) 80(5) 111(6)	8200(1)	0.98(1)	9.6(1)	6-325(6)	1.3(5)
Belle Ayr	68-74(1) 70(2,3,4,5,6)	8020(1,2) 8,800(3) 8,820(4)	0.62(1,2) 0.68(3,9)	6.4(1,2) 5.3 (3,4)	35 ave. (2) 70 ave.(3) 20-60(2) 15-250 (4, 5) 30-240 (6)	1.0(3)
Wyodak	75-80(1,6) 80(2) 85(3,7) 82(4) 75(5)	8350(1) 8300(2) 8250(3) 8322-8526 (4) 8,255(7)	0.60(1) 0.63 (2) 0.61(3, 7) 0.37-0.76(4)	5.9(1,2,7) 6.0(3) 5.0-8.0(4)	30 ave. (15-40) (2) 30(3) 10-170(6)	0.3(3) S.Pit 0.9, N.P.t 2.3(
Caballo	70+(1)70(5) 71(6) 75(9)	8200(1) 7,977(9)	0.61(1) 0.44 (9)	6.0(1) 7.9(9)	140 ave.(5, 9) 50-240 (6) 0-275 (9)	
Pronghorn	65-80(5,6)	8200(1)	0.61(1)	6.0(1)	50-250(5,6)	
Rojo Caballas	10-80(5) 65(11)				150 ave, 310 max (11) 15-300(5)	

NOTE: Numbers in ( ) refer to data sources.

TABLE A.3.3 (continued)

Mine Name	Seam Thickness (ft.)	Heat Content (Btu/lb.)	Sulfur (lbs/10^6Btu)	Ash (%)	Overburden (ft.)	Strip Ratio
Cordero	59(1) 54(3) 64(4) 52-64(5)	8150(1) 8185(3) 8153(4)	0.37(1,3) 0.39(4)	5.8(1,4) 6.0(3)	130 ave.(3) >200 max(5)	2.2(3,5)
Coal Creek	35(1) 33(5,6,10)	8200(1) 8224(10)	0.61(1,10)	6.0(1,10)	10-175(5,10) 10-140(6)	
Jacobs Ranch	57(1,3,5,7) 59(6)	8525(1,3) 8200(4) 8527(7)	0.59(1,3) 0.61(4) 0.55(7)	5.8(1,3,7) 5.9(4)	110 ave.(3) 88 ave.(5,6) 0-160(6) 20-168(7)	2.1(3,7) 1.4-2.5(7
Black Thunder	65-70(1) 68(4,5,6) 60-73(7)	8600(1,3,4) 8622(7)	0.35(1,3) 0.40(4) 0.38(7)	4.8(1,4,7) 5.0(3)	135 ave.(3) 120 ave.(5) 123 ave.(7) 15-220(5,6)	1.8(3)
Dave Johnston	51(1,3) 53(2) 49(4) 47(6)	7500(1,3) 7950-8200(2) 7669-8001(4)	0.67(1,3) 0.57-0.73(2) 0.57-0.82(4)	12(1,3) 11-12(2) 8.0-8.8(4)	110(60-200)(2) 60-120(3) 65-80(4) 20-150 overburden 85-180 interburden(6)	3.3(1)
Bighorn No. 1[1/]	52(1,2) 50(3)	9300(1,2,3)	0.65(1,2) 0.75(3)	5.3(1,2,3)	100(15-200)(2) 125(3)	2.3(3)
Welch[1/]	13 (1,2)	8900(1,2)	1.7(1,2)	11(1,2)	50(20-70)(2)	

[1/] Nonfederal mines. Welch mine no longer operating.

Data Sources:
(1) Western Coal Planning Assistance Project (1979)
(2) EPA (1976)
(3) Kelly (1979)
(4) Dames & Moore (1980)
(5) BLM Buffalo Office (unpublished data)
(6) USGS Casper Office (unpublished data)
(7) EPRB EIS - BLM (1974)
(8) EPRB EIS - BLM (1979b)
(9) Caballo EIS - USGS (1979b)
(10) Coal Creek EIS - USGS (1979C)
(11) Rojo Caballos EIS - OSM (1980)

TABLE A.3.4 - GEOTECHNICAL DATA: DEVELOPED FEDERAL LEASES, SOUTHERN WYOMING

Mine Name	Mine Type	Combined Average Seam Thickness	Heat Content (Btu/lb)	Sulfur (lbs/10^6Btu)	Ash (%)	Overburden (ft)	Strip Ratio
Carbon County	U	19(2)	11,124(2)	0.65(2) 1/	7.7(2)	--	--
Rosebud	S	35(1) 45(2)	10,300(1) 9,993-10,945(2)	0.97(1) 0.66-1.33(2)	6.7(1) 6.5-10.5(2)	140(1)	7.0(1)
Seminoe #2	S	50(1) 48(2)	11,350(1) 9930-10,607(2)	0.35(1) 0.46-1.35(2)	6.0(1) 7.6-18.3(2)	150(1)	4.6(1)
Vanguard #2	U	17(2)	10,070(1)	0.44(1)	10.9(1)	--	--
Rimrock	S	7(1)	10,300(1)	0.58(1)	7.0(1)	30-60(1)	8.0(1)
Medicine Bow	S	27(1) 23.5(2)	10,200(1) 9,710-10,670(2)	0.49(1) 4 seams ave. <.75(2)	7.5(1) 6.0-13.0(2)	150(1,2)	6.7(1)
Seminoe #1	S	44(1)	10,000(1) 9406-10,433(2)	0.5(1) 0.41-0.86(2)	7.0(1) 6.2-12.1 (2)	150(1)	6.3(1)
Stansbury	U	6-7(2)	12,300(2)	0.57(2)	5.0(2)	--	--
Jim Bridger	S	28(1)	9350(3)	0.53(1)	10.0(1) 9.7 (2)	100(1)	4.9(1)
Black Butte	S	36(4) 2/	9,674(4) 2/	0.54(4) 2/	7.25 2/	--	--
Elkol Sorenson	S	300(1) 10-80(2)	8500(1) 9604(2)	0.59(1) 0.71(2)	6.0(1) 6.1(2)	95-100(1)	4.0(1)
Skull Point	S	50(1)	9500(1)	0.63(1)	4.8(1)	180(1)	3.3(1)

1/ Two other seams not being mined because they are noncompliance.

2/ Weighted average of 3 seams.

NOTE: Numbers in ( ) refer to data sources.

Data Sources:

(1) Kelly (1979)
(2) Dames & Moore (1980)
(3) BLM (1978b)

TABLE A.3.5 Detailed Summary of Demand/Production Projections for Powder River Basin

Source of Projection		1985			1990		
		Low	Medium	High	Low	Medium	High
US Bureau of Mines (1972)		-	-	-	75	426	763
BLM (1974)	Wyoming only	-	122(WY)	-	-	150 (WY)	-
Harza (1976) 1/	Montana	25	84.6	100.0	-	123.1	133.3
	Wyoming	41.5	74.5	103.5	-	93.7	136.8
	Total	66.5	159.1	203.5	-	216.8	270.1
Montana University 2/ Coal Demand Study Team (1976)	Montana	9	38	48	-	-	-
	Wyoming	21	85	107	-	-	-
	Total	30	123	155	-	-	-
DOE (1978)	Table 2	223.4	305.6	348.9	267.7	529.0	763.7
	Table 10	140.4	204.6	232.1	173.7	396.1	602.9
DOE (1979)	Montana	61.0	77.4	93.9	196.2	280.3	310.9
	Wyoming	60.5	60.2	63.4	95.7	137.4	148.5
	Total	121.5	137.6	157.3	291.9	417.7	459.4
USGS (1980) BLM (1979b)	Montana	50.8	83.2	98.2	55.1	88.0	124.5
	Wyoming	165.6	169.6	270.6	170.3	174.3	330.3
	Total	216.4	252.8	368.8	225.4	262.3	454.8
DOE (1980)	Montana	36.4	63.0	120.0	69.6	117.1	238.6
	Wyoming	92.3	95.6	102.6	116.1	158.1	199.4
	Total	128.7	158.6	222.6	185.7	275.2	438.0

1/ 1990 projections interpolated between 1985 and 2000 projections.

2/ Low projection assumed 1% electrical growth rate (EGR) and partial flue gas desulfurization (FGD), medium assumed 3% EGR, all FGD and high assumed 5% EGR and all FGD.

TABLE A.3.6 DETAILED SUMMARY OF DEMAND/PRODUCTION PROJECTION FOR SOUTHERN WYOMING

	1985			1990		
	Low	Medium	High	Low	Medium	High
DOE 1978	79.1	97.1	112.9	90.1	129.1	156.9
BLM (1978 a & b) 1/	29.6	50.4	67.1 2/	27.8	49.0	72.2 3/
DOE 1979	56.8	59.2	60.1	83.7	85.6	91.6
DOE 1980	43.9	49.8	52.2	54.6	57.9	62.8
Glass (1980)	--	37.2	--	--	55.4	67.7

1/ Combined projections from Southcentral and Southwest Wyoming Environmental Impact Statements

2/ Includes 12.3 MTPY unleased federal coal in Southcentral Wyoming

3/ Includes 18.8 MTPY of unleased federal coal in Southcentral Wyoming.

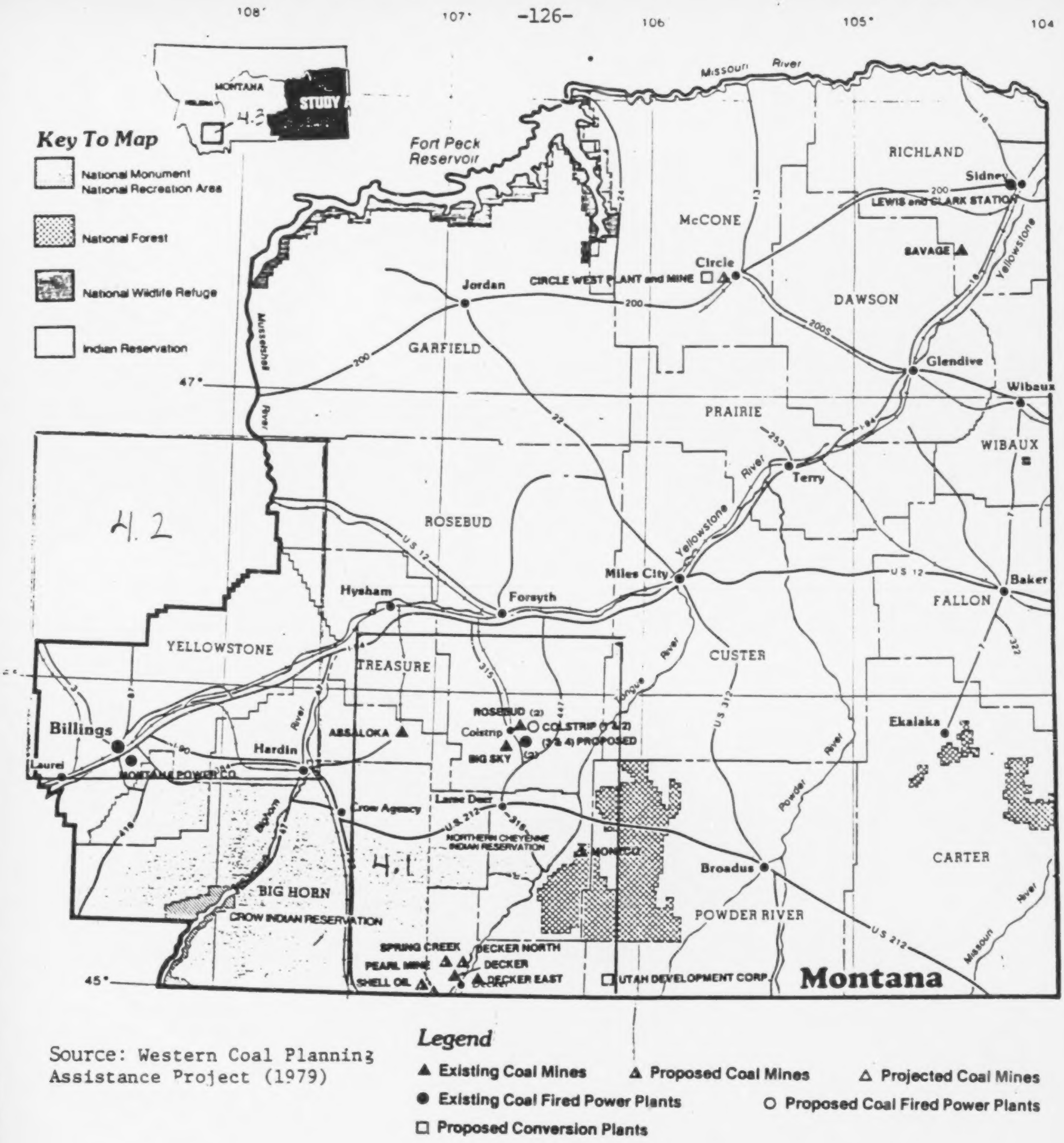
APPENDIX 4. SUPPLEMENTAL DATA FOR MONTANA

Table A.4.1	Montana Lease Block Identification List
Map 4	Existing and Proposed Coal Mines, Southeastern Montana, and Index of Lease Maps
Maps 4.1-4.3	Lease Block Location Maps
Table A.4.2	Summary of Undeveloped Lease Block Screening: Montana Undeveloped Lease Summary Sheets
Table A.4.3	Production Capacity and Reserves, Existing and Proposed Mines in Montana
Table A.4.4	Geotechnical Data, Existing Mines in Montana

TABLE A.4.1 MONTANA LEASE BLOCK IDENTIFICATION LIST

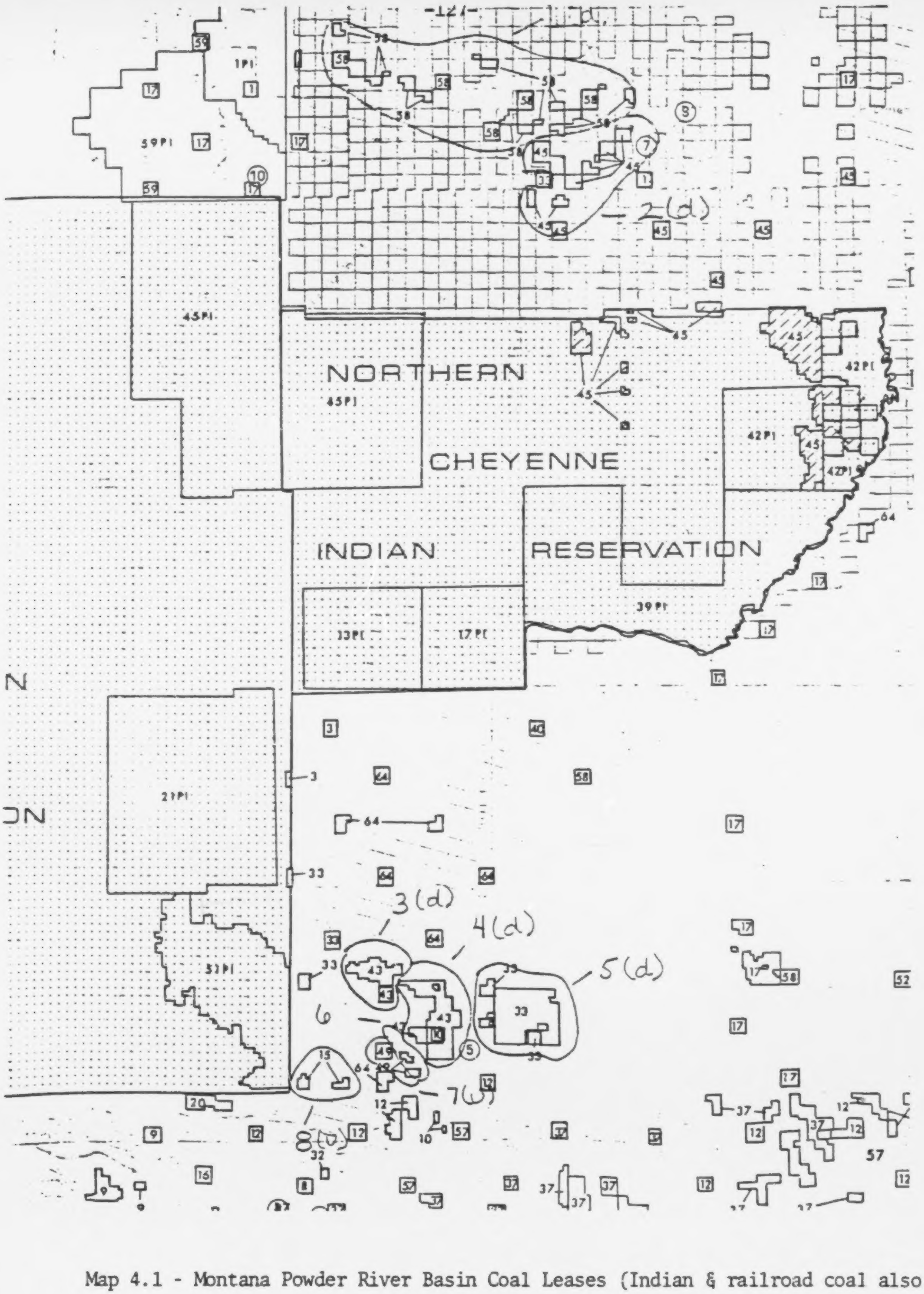
BLOCK #	MINE NAME	OWNER/PARENT COMPANY	COUNTY	SERIAL NO(S).	ACRES	DATE ISSUED	DEVELOPMENT STATUS	MAP #
1	Colstrip (Rosebud)	Western Energy/Montana Power Co.	Rosebud	M42381 B020989 M073109 M35734 M35735	61 1446 5792 480 447 8226	6/1/80 5/5/23 9/1/66 8/1/79 8/1/79	D	4.1
2	Big Sky	Peabody Coal Co.	Rosebud	M15965	4307	4/1/71	D	4.1
3	Spring Creek	Spring Creek Coal/ Pacific Power & Light	Big Horn	M069782	2347	7/1/65	D	4.1
4	East Decker	Decker Coal/ Peter Kiewit Sons, Inc.	Big Horn	M073093	9410	8/1/66	D	4.1
5	West Decker	Decker Coal/PKS	Big Horn	M06770 1/ M057934A M061685 M057934	40 1841 2360 720 4961	1/1/54 10/1/63 10/1/64 10/1/63	D	4.1
6	PKS CX Ranch	Rosebud Coal Sales, Inc./ Peter Kiewit Sons, Inc.	Big Horn	M061686	524	3/1/64	U	4.1
7	CX Ranch	Consol/Conoco	Big Horn	M46292	674	3/1/64	U	4.1
8	Pearl	Shell	Big Horn	M069945	541	7/1/65	U	4.1
9	Divide	Divide Coal Mining Co.	Musselshell	M052647	80	11/1/62	D	4.2
10	Johnson	G & A Johnson	Musselshell	B028531	80	3/3/28	U	4.2
11	Bugni	A., T. and R. Bugni	Madison	GF082523	80	8/6/42	U	4.3

1/ Lease held by Catherine and William Kukuchka.

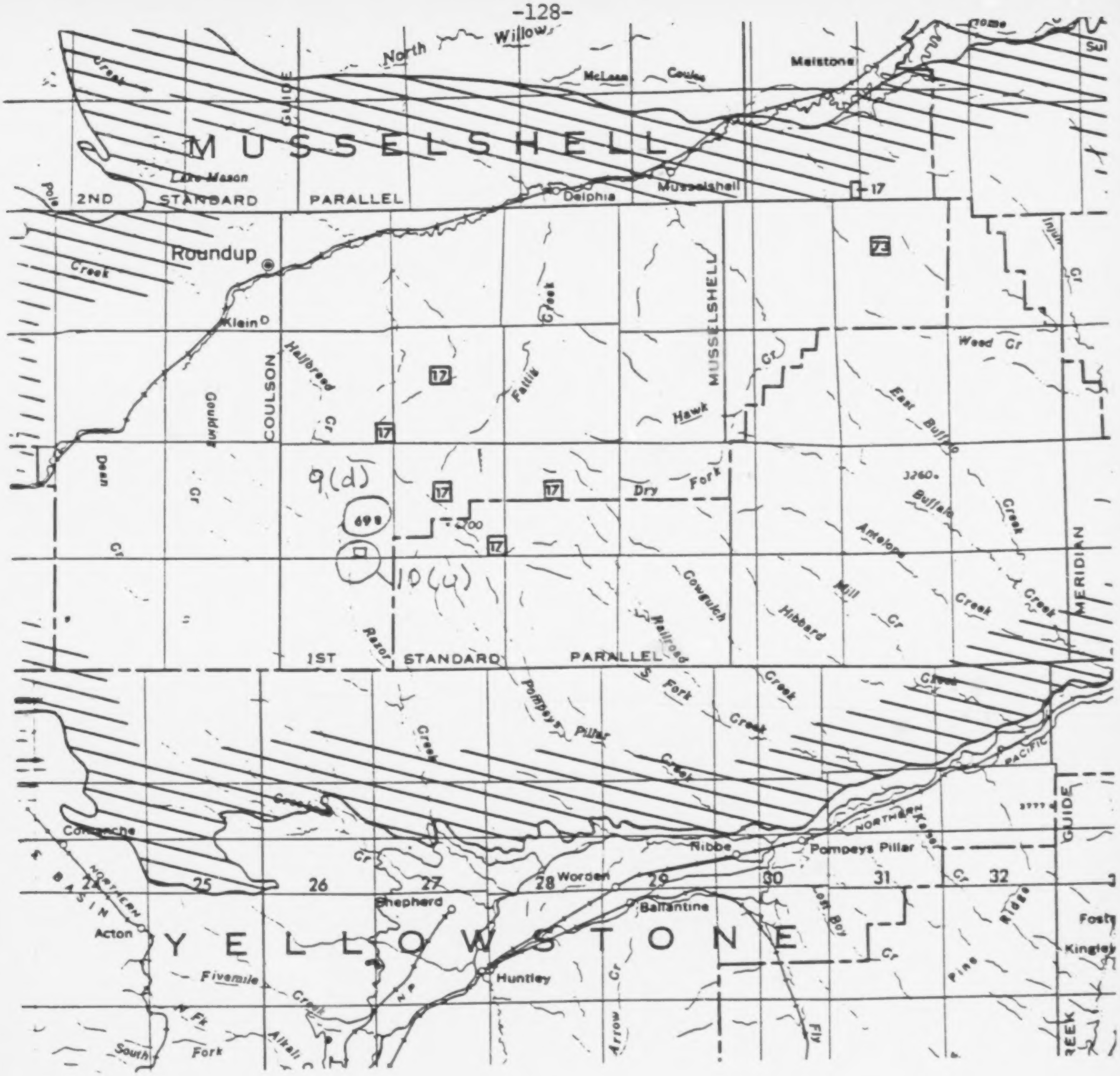


Source: Western Coal Planning
Assistance Project (1979)

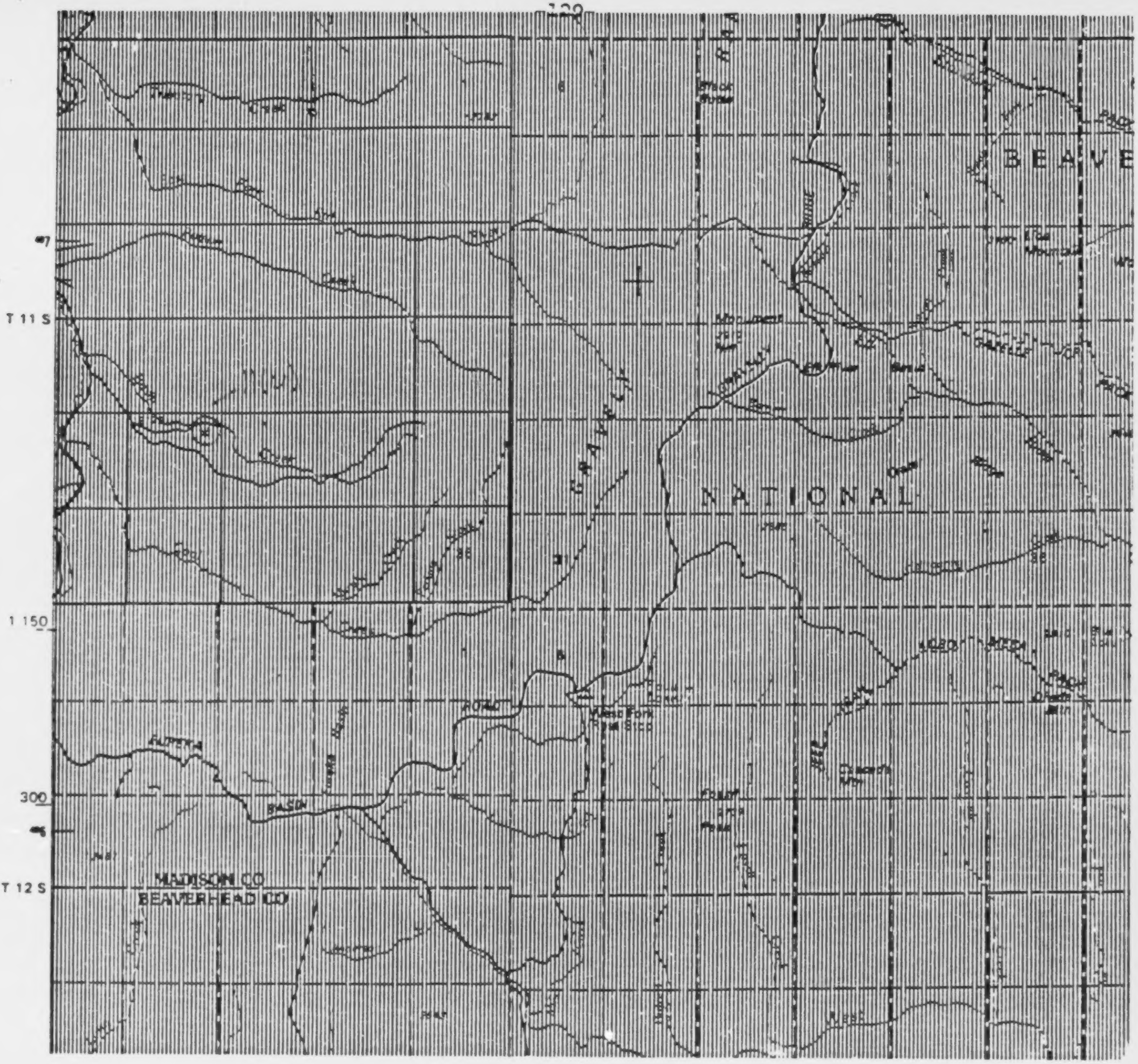
Map 4 - Southeastern Montana: Existing and Proposed Coal Mines (and index of lease maps)



Map 4.1 - Montana Powder River Basin Coal Leases (Indian & railroad coal also shown



Map 4.2 - Bull Mountain Coal Leases



Map 4.3 - Madison County, Southwest Montana Coal Lease

TABLE A.4.2 - SUMMARY OF UNDEVELOPED LEASE BLOCK SCREENING: MONTANA

n.a. = not applicable
-- = unfavorable
? = uncertain
+ = favorable

Block #	Block Name	TYPE OF RESERVE	IS BLOCK A VIABLE MINING UNIT?	MEETS RESERVE CRITERIA?	MEETS BTU CRITERIA?	MEETS SULFUR CRITERIA?	MEETS ASH CRITERIA?	MEETS THICKNESS CRITERIA?	MEETS STRIP RATIO CRITERIA?	End Use			DEVELOPMENT PROSPECTS	1986 PRODUCTION PROSPECTS	1991 PRODUCTION PROSPECTS	Comments
										EXPORT?	ON-SITE POWER?	ON-SITE SYNFUEL?				
6	PKS CX Ranch	S	?	?	yes	yes	no	yes	no	yes	no	no	+	?	?	
7	CX Ranch	S	no	no	yes	yes	no	yes	no	yes	no	no	+	--	?	
8	Pearl	S	no	yes	yes	yes	yes	yes	no				?	--	--	
10	Johnson	U	no	no	yes	yes	yes	yes	n.a.				--	--	--	
11	Bugni	U	no	no	yes	yes	yes	no	n.a.				--	--	--	

UNDEVELOPED LEASE BLOCK SUMMARY SHEET

Lease Block Name: PKS CX Ranch

Map Ref. No. 6

Owner/ Parent Co. Rosebud Coal Sales/ Peter Kiewit Sons, Inc.

County: Bighorn

State: MT

Location: T9S R40E

AMS Sheet Hardin

7.5' Quad Decker/Pearl School

LEASE DATA

Lease Number	Acres	Reserves M Tons	Btu/lb.	Sulfur %	Sulfur #M Btu	Ash (%)	Seam thick. (ft.)	Overburden thick. (ft.-ave.)	Overburden ratio
M061686	524	<30	9,647	0.33	0.34	22.1	>20		>3.5

Total/ Average Coal quality data from GMO. No coal quality data in ACLDS - strip ratio estimated from GMO data.

APPLICATION OF SCREENS

Primary Screens								Secondary Screens (+ favorable - unfavorable)					
LMU	Res.	Btu	S	Ash	Seam Thick.	Overburden Thick.	Overburden Ratio	Own.	Act.	Tran.	Geo.	Env.	Leg.
Yes	Yes	Yes	Yes	No	Yes		No	+	+	+	-	-	+

Development Prospects: Favorable, contingent on development with associated non-federal coal. If favorable, suitable for Yes steam (export) no steam (on-site) no synthetic fuels (on-site)

Production Prospects 1986: Uncertain 1991: Uncertain

COMMENTS: The lease is near but not contiguous with Decker East, so it will have to be developed as a separate mine. Reserves on this lease alone are not sufficient to open a mine, but Peter Kiewit Sons recently assigned the portion of this lease that is on the south side of Squirrel Creek to Consolidation Coal Company, apparently in exchange for the right to mine fee coal that is leased by Consol around this lease. PKS holds a state coal lease near the federal lease as well. Baseline studies are being conducted in the area and recent projections (September 1980) list this as an "expected" mine with production beginning in 1984 and reaching an annual production rate of 4 MTPY by 1986.

The lease includes alluvial valley floors along Squirrel Creek that are significant to agriculture, and according to GMO data, the alluvial valley floor apparently reduces recovery of surface mineable reserves to 30% (compared a typical recovery rate of 90%). Because of uncertainties related to alluvial valley floor requirements and also the high strip ratio, this block has uncertain production prospects in 1986, and favorable production prospects in 1991.

OTA follow-up (from Schmidt, Porte and Silverman, 1980):

As discussed in the following summary sheet (Consol CX Ranch), Rosebud Coal Sales has developed an integrated mining unit north of Squirrel Creek involving federal, state, and fee coal. The block would be developed separately from the Consolidation Coal block and the West Decker Mine. Environmental studies are underway, and Rosebud Coal Sales would like to submit a mine permit application in 1981. As such, production could begin in 1984, however, no markets have been identified. Although Rosebud Coal Sales will develop a 4 mty capacity, given the current market situation, it is uncertain when this lease might actually start producing coal.

UNDEVELOPED LEASE BLOCK-SUMMARY SHEET

Lease Block Name: CX Ranch

Map Ref. No. 7

Owner/ Parent Co. Consolidation Coal Co.

County: Bighorn

State: MT

Location: T9S R40E

AMS Sheet Hardin

7.5' Quad Decker, Pearl School

LEASE DATA

Lease Number	Acres	Reserves	Btu/lb.	Sulfur		Ash	Seam thick.	Overburden thick.	ratio
		M Tons		%	#M Btu	(%)	(ft.)	(ft.-ave.)	
M46292	674	<30	9647	0.33	0.34	2.21	>20		
Total/ Average									

Coal quality data from GMO. No coal quality data in ACLDS. Reserves in GMO pro-rated between PKS CX Ranch and CX Ranch.

APPLICATION OF SCREENS

Primary Screens								Secondary Screens (+ favorable - unfavorable)					
					Seam	Overburden							
LMU	Res.	Btu	S	Ash	Thick.	Thick.	Ratio	Own.	Act.	Tran.	Geo.	Env.	Leg.
yes	yes	yes	yes	no	yes	-	-	+	+	+	-	-	+

Development Prospects: Favorable, contingent on development with associated non-federal coal.

If favorable, suitable for yes steam (export) no steam (on-site) no synthetic fuels (on-site)

Production Prospects 1986: Unfavorable 1991: Uncertain

COMMENTS:

This lease was recently acquired by Consol from Rosebud Coal Sales for integration into the proposed CX ranch which until this lease assignment involved only state and private coal. Baseline studies are underway on the lease and recent projections indicate this mine is likely to be in production in 1983. This lease is on the south side of Squirrel Creek and alluvial valley floor considerations discussed in relation to PKS CX Ranch apply here too.

OTA follow-up (from Schmidt, Porte and Silverman, 1980):

This lease in Big Horn County, Montana, is located about two miles southwest of the West Decker Mine. The lease was recently acquired from Rosebud Coal Sales Co. and is located south of Squirrel Creek, a potential alluvial valley floor. Federal coal has been integrated with state and fee coal already held by Consolidation Coal. North of Squirrel Creek, Rosebud Coal Sales is proposing development of the rest of its James lease along with fee reserves recently obtained from Consolidation Coal. Consolidation Coal is also proposing exchange of leases presently held on the Northern Cheyenne Reservation for unleased coal adjacent to the CX Ranch area. This transfer may be completed by the end of 1984, following evaluation work and land use studies by the USGS and Bureau of Land Management. The transfer would add 100 million tons of in-place reserves to the mining unit. Until that transfer is completed, company officials state that the area will not constitute a logical mining unit, even though mining will be proposed in a permit application to be submitted in summer, 1981.

CX Ranch continued

The area is underlain by the 80-foot thick Anderson/Dietz seam and the 20 foot thick Canyon seam which will not be mined. Consolidation estimates that about 110 mt of recoverable reserves in the Anderson/Dietz seam exist in the present mining unit. However, several tens of millions of tons of reserves may be lost if Squirrel Creek cannot be mined due to alluvial valley floor considerations. The mine deposit would be mined by truck/shovel combinations.

Consolidation Coal hopes to submit a mine permit application. Approval might be gained in summer, 1982, with production in 1984. No coal from this tract has been sold and Consolidation Coal is exploring steam/electric and synthetic fuels markets. In light of the lack of new market development, it is unlikely that production will begin before 1986. Under the high market demand scenario, production could reach 8 mty by 1990. Under the low demand scenario, the lease block may not be able to develop any markets by 1990.

UNDEVELOPED LEASE BLOCK SUMMARY SHEET

Lease Block Name: Pearl

Map Ref. No. 8

Owner/ Parent Co. Shell Oil Co.

County: Bighorn

State: MT

Location: T9-10S, R38-39E

AMS Sheet Hardin

7.5' Quad Pearl School
Bar V Ranch

LEASE DATA

Lease Number	Acres	Reserves	Btu/lb.	Sulfur		Ash	Seam thick.	Overburden thick.	ratio
		M Tons		%	#M Btu	(%)	(ft.)	(ft.-ave.)	
M069945	541	GMO	7041- 9563	0.38- 2.01	0.42- 2.85	4.0- 18.9	>20		
		46.5 EIS	8099- 9519	1.79- 0.40	2.2- 0.45	3.44- 8.23	82 total		4.0

Total/
Average

Coal quality and reserve data from GMO and USGS (1980b).

APPLICATION OF SCREENS

Primary Screens								Secondary Screens (+ favorable - unfavorable)					
LMU	Res.	Btu	S	Ash	Seam Thick.	Overburden Thick.	Overburden Ratio	Own.	Act.	Tran.	Geo.	Env.	Leg.
no	yes	yes	yes	yes	yes		no	+	-	+	-	-	+

Development Prospects: Uncertain

If favorable, suitable for ____ steam (export) ____ steam (on-site) ____ synthetic fuels (on-site)

Production Prospects 1986: Unfavorable 1991: Unfavorable

COMMENTS:

This lease is interesting in that it got as far as having an EIS prepared before the mine proposal was abandoned. The lease does not form a viable mining unit since the lease is separated by unleased federal coal. The proposed permit area contained 760 acres of unleased federal coal. The lease has four minable coal seams, with one thin seam of poor quality (relatively low Btu and high sulfur) but overall the reserves meet the coal quality criteria. The stripping ratio is rather high compared to Wyoming mines averaging 4.5 over the life of the mine. According to the EIS, the lease contains about 60 million tons of coal, but because of geologic abnormalities, lease line setback and the angle of pit slopes, recovery would be only about 78%. A corner of the "South Pit" lease may include alluvial valley floor along Little Youngs Creek.

This mine appears to have been a "foot-in-the-door" proposal that Shell kept active while it was negotiating with the Crow for the Young's Creek lease. Once an agreement was reached with the Tribe for that lease, the Pearl Creek mine was dropped.

UNDEVELOPED LEASE BLOCK SUMMARY SHEET

Lease Block Name: Johnson   Map Ref. No. 10

Owner/
Parent Co. Glenn and Alice Johnson

County: Musselshell
State: MT

Location: T7N R26E
AMS Sheet Roundup
7.5' Quad none

LEASE DATA

Lease Number	Acres	Reserves	Btu/lb.	Sulfur		Ash	Seam thick.	Overburden thick.	ratio
		M Tons		%	#M Btu	(%)	(ft.)	(ft.-ave.)	
B028531	80	<30 GMO (underground reserves)	11,107	0.71	0.63	6.5	>5		
Total/ Average									

Coal data from GMO.

APPLICATION OF SCREENS

Primary Screens								Secondary Screens (+ favorable - unfavorable)					
					Seam	Overburden							
LMU	Res.	Btu	S	Ash	Thick.	Thick.	Ratio	Own.	Act.	Tran.	Geo.	Env.	Leg.
no	no	yes	yes	yes	yes			?	+	+	+	+	-

Development Prospects: Unfavorable   If favorable, suitable for ____ steam (export)
____ steam (on-site) ____ synthetic fuels (on-site)

Production Prospects 1986: Unfavorable   1991: Unfavorable

COMMENTS:

This lease has produced small amounts of coal for local consumption from an underground mine in the past, but shut down because of problems meeting health and safety requirements and lack of reserves. The owners have expressed interest in reopening, but would need to lease more federal coal reserves. However, the lease is so small that the mine cannot obtain sufficient reserves under the short term leasing criteria.

UNDEVELOPED LEASE BLOCK SUMMARY SHEET

Lease Block Name: Bugni

Map Ref. No. 11

Owner/Parent Co. Adolph, Thomas and Robert Bugni

County: Madison

State: MT

Location: T11S R3W

AMS Sheet Ashton

7.5' Quad Monument Ridge 15

LEASE DATA

Lease Number	Acres	Reserves	Btu/lb.	Sulfur		Ash	Seam thick.	Overburden thick.	ratio
		M Tons		%	#M Btu	(%)	(ft.)	(ft.-ave.)	
GF082523	80	< 30	12850	0.4	0.31	2.7	< 5		
Total/ Average									

Coal quality data from ACLDS.

APPLICATION OF SCREENS

Primary Screens								Secondary Screens (+ favorable - unfavorable)					
					Seam	Overburden							
LMU	Res.	Btu	S	Ash	Thick.	Thick.	Ratio	Own.	Act.	Tran.	Geo.	Env.	Leg.
no	no	yes	yes	yes	no								

Development Prospects: Unfavorable If favorable, suitable for _____ steam (export) _____ steam (on-site) _____ synthetic fuels (on-site)

Production Prospects 1986: Unfavorable 1991: Unfavorable

COMMENTS:

This lease last produced coal in 1946 and there are no indications of efforts to reopen the mine. Coal is high quality, but reserves are small and the seam is thin. In addition, the seam dips 30° making for difficult mining conditions. The lease is apparently being used as the site for a hunting club, and USGS has recommended that the lease be cancelled.

TABLE A.4.3 PRODUCTION CAPACITY AND RESERVES: EXISTING & PROPOSED MINES IN MONTANA

(Excluding Fort Union Region)

	MINE NAME	PEAK CAPACITY	MINE CAPACITY (MTPY)	RESERVES (MT)
Federal Developed				Possibly 200 mt additional at >100 ft. overburden
				Area A:
	Big Sky	5	5(1) 4.0(3) 4.2(4,8,10)	30(4), 27.6(10), 40.3(1) Area B&C:
	Decker East		8.0(10) 6.6(8)	320 164 (10)
	West	16	16(1,3) 10.0(10) 7.0(2,8)	1000(1); 106 471(5) 76.0(10)
	North		3.0(10) 2.5(8)	47 65.6(10)
	Spring Creek	10	10(1,6) 7.0(8)	250(1) 405(6)
	Colstrip	19	10(1) 19.1(3) 18.2(8) 6.2 Areas A&E(10)	850(2) 63.0 Areas A&E(10)
Federal Undeveloped	Consol CX Ranch	8	8.0(8)	160 est.
	PKS CX Ranch	4	4.0(8)	80 est.
	(Pearl)	2	2.0(1)	38.5(1) 46.5 rec(7)
Indian	Absaloka Tract III	15	15(1) 6.5(3) 10(8)	800(1) 625 rec 800 tot(2) 625(12)
	Absaloka Tract II	?		
	Youngs Creek	8	32(1) *8.0(8) 7.0(13)	235(1) 210(13)
	Tanner Creek	24		
Other	Montco (Nance)	12	12(1) 9(8)	450(1)
	Dominy	4	4.0(8)	80 est.
	Amoco	10	10(8)	200 est.
	Cook Mountain	10	10(8)	200 est.
	Otter Creek	5	5.0(8)	100 est.
		139		
Mines Outside the Powder River Basin	Brophy #2	0.2	0.2(8)	
	Divide	0.02	0.02(10)	0.165(10)
	Bear Tooth	2.0	2.0(8)	40 est.
	Bull Mountain	2.0	2.0(8)	40 est.
		4.2		

*Youngs Creek and Tanners Creek combined

Table A.4.3

Data Sources:
(1) Western Coal Planning Assistance Project (1979)
(2) Environmental Protection Agency (1976)
(3) Kelly (1979)
(4) U.S. Geological Survey (1979a)
(5) U.S. Geological Survey (1976)
(6) U.S. Geological Survey (1979d)
(7) U.S. Geological Survey (1980b)
(8) Unpublished projections, Northern Powder River Basin Coal Leasing EIS, September 1980.
(9) ICF (1980a)
(10) Dames and Moore (1980)
(11) U.S. Geological Survey (1974)
(12) Bureau of Indian Affairs (1973)
(13) *Coal Week*, October 1980

TABLE A.4.4 GEOTECHNICAL DATA: MONTANA EXISTING MINES

MINE NAME	SEAM THICKNESS (ft.)	HEAT CONTENT (BTU)	SULFUR ($lbs/10^6$ BTU)	ASH (%)	OVERBURDEN (ft.)	STRIP RATIO
Colstrip	23(1) 27(2) 25(3) 24(4)	8750(1) 8800(2) 8700(3) 8750-9018(4)	0.91(1,2) 0.8(3) 1.01-1.11(4)	8.4(1,2) 8.9(3) 8.0-8.4(4)	90(30-160)[2] 75-100(3)	3.0(3)
Big Sky	26(1) 36(2) 35(3) 37(4)	8450(1,3) 8600-8750(2) 8360(4)	0.89(1) 0.86-0.91(2) 0.95(3) 1.2(4)	10.4(1,3) 8.4-8.5(2) 9.1(4)	50-90(2) 75(3)	2.0(3)
Spring Creek	50-80(1)	9400±(1)	0.53±(1)			
Decker East	52(1,2,3) 55(4)	9600(1,2) 9650(2) 9129-9696(4)	0.41(1,2) 0.42(3) 0.44-0.58(4)	3.7(1,2,3) 3.7-4.8(4)	70(0-150)[2] 98(3) 30-220 (4)	1.8(3)
North West	38(4) 50(4)	9380-9738(4) 9553(4)	0.43-0.45(4) 0.35(4)	4.1-5.1(4) 3.7(4)	140(4)	
Absaloka	58(1,2,3)	8450(1,3) 8223-8573(3)	0.47(1) 0.61-1.86(2) 0.83(3) 0.59(4)	10(1) 7.8-12.8(2) 11(3) 5.7(4)	80(20-200)[2] 100(3) 60(4)	2.2(3)
Divide	8(4)	10,150(4)				

Data Sources
- (1) Western Coal Planning Assistance Project (1979)
- (2) EPA (1976)
- (3) Kelly (1979)
- (4) Dames & Moore (1980)

NOTE: Numbers in ( ) refer to data sources.

APPENDIX 5. WYOMING TASK FORCE AGENDA, AND LIST OF INVITEES AND ATTENDEES

AGENDA

OTA Wyoming Coal Leasing Task Force
October 14, 15 and 16, 1980

Conference Room
Wyoming State BLM Office
26th Street and Warren Avenue
Cheyenne, Wyoming
(307) 778-2220, Ext. 2413

Tuesday, October 14

8:30 - 9:00 INTRODUCTIONS

9:00 - 11:00 PANEL I: Legal and Legislative Issues

Chair: Karen Larsen, OTA

Panelists: J. Stan McKee
Wyoming State BLM Office

Warren White
Office of the Governor

Jerry Boggs
Office of Surface Mining

Chris Farrand
Peabody Coal Co.

11:15 - 12:00 PANEL II: Regional Environmental Issues

Chair: Jack C. Schmidt, OTA

Panelists: Reed Zars
Powder River Basin Resource Council

Walt Ackerman
Land Quality Division
Department of Environmental Quality

Charles A. Collins*
Air Quality Division
Department of Environmental Quality

Harry J. Harju
Wyoming Game and Fish Department

*Not present

12:00 - 1:00	Lunch
1:00 - 2:15	PANEL II (continued)
2:30 - 4:30	PANEL III: Regional Infrastructure Issues

Chair: Michael Gargas McGrath, OTA

Panelists: Joseph Evans
Department of Economic Planning and Development

Richard Moore
Industrial Siting Administration

Jim Vandel
Wyoming Highway Department

Ronald Monheiser
Energy Transportation Systems, Inc.

Wednesday, October 15

8:30 - 10:30 Round Table I: OTA Projections for Wyoming Coal Production and Markets

Chair: James S. Cannon, OTA

Discussants: Gary B. Glass
Wyoming Geological Survey

John Wiener
Environmental Consultant/Attorney

Marion Loomis
Wyoming Mining Association

Stephen Berg-Hansen
Rocky Mountain Energy Company

10:45 - 12:00 Round Table II: OTA Technical Assessment Methodology

Chair: Russell Boulding, OTA

Discussants: Gary B. Glass
Wyoming Geological Survey

Arnie Matilla
U.S. Geological Survey

Kenneth Nation
U.S. Geological Survey

J. Stan McKee
Wyoming State BLM Office

12:00 - 1:00	Lunch
1:00 - 2:00	Round Table II (continued)
2:15 - 5:00	Assessment of Undeveloped Leases and Lease Blocks: Powder River Basin

Thursday, October 16

8:30 - 12:00	Assessment of Undeveloped Leases and Lease Blocks: Powder River Basin
12:00 - 1:00	Lunch
1:00 - 4:30	Assessment of Undeveloped Leases and Lease Blocks: Other Wyoming Coal Basins

OTA WYOMING TASK FORCE INVITEES AND ATTENDEES

Mr. Walt C. Ackerman
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Mr. Stephen Berg-Hansen
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Mr. Richard Moore
Director, Industrial Siting
Administration
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Mr. Kenneth Nation
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APPENDIX 6. USE OF THE USFWS WELUT RAPID ASSESSMENT METHODS PROCESS FOR EVALUATING EXISTING FEDERAL LEASES IN THE GILETTE AREA

Background

Methods Used

Maps 6.1 - 6.3	Gillette Review Area

Results

Table A.6.1	Lease Data, Gillette Area
Table A.6.2	PRLA Data, Gillette Area
Table A.6.3	Alluvial Valley Floor Summary Table, Developed Coal Reserves, Powder River Basin
Table A.6.4	Strippable Coal Reserves with High and Moderate Coal Development Potential in Five Quadrangles, Campbell County, Wyoming

Conclusions

Procedures for Calculating Coal Reserves

Table A.6.5-9	Lease and PRLA reserves in different categories of overburden depth and stripping ratio, five quadrangles in the Gillette Area

Background

In November 1980, OTA and the U.S. Fish and Wildlife Service developed a cooperative agreement to allow the Western Energy and Land Use Team (WELUT) to use its Rapid Assessment Methods (RAM) system to provide additional information for OTA's evaluation of undeveloped leases in Campbell County, Wyoming. Data on coal reserves and environmental information had been entered into the RAM system to assist BLM in updating the Management Framework Plan (MFP) for the Gillette Review Area in Campbell County, Wyoming (BLM, 1980a).

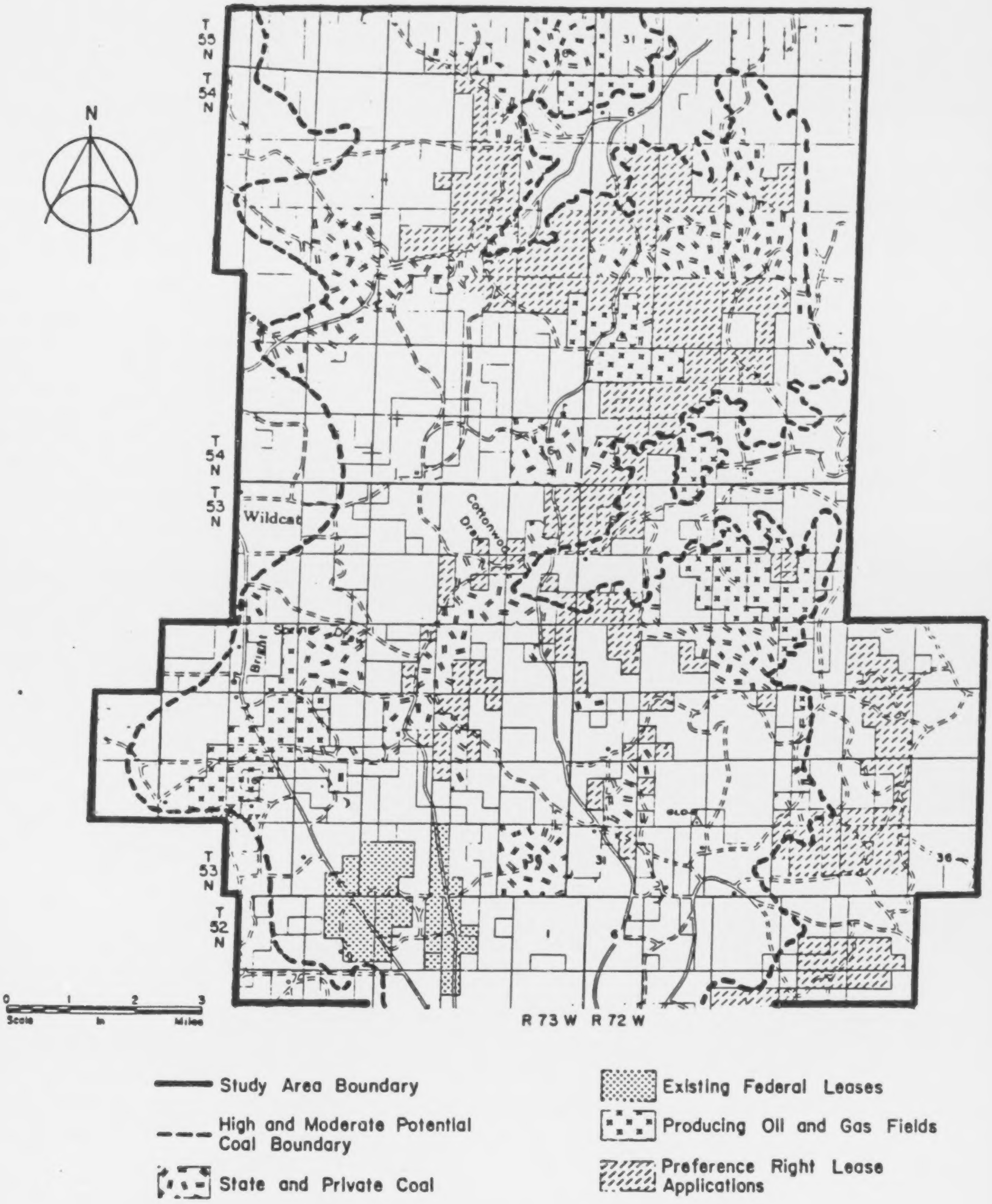
WELUT provided information to OTA in two phases: 1) the RAM process was modified slightly to allow existing data in the system to be obtained on a lease by lease basis and OTA was provided with analyses showing coal reserves and acres of potential alluvial valley floor (as delineated by BLM) for all leases and PRLAs in the Gillette Review Area; and 2) because coal reserve data in the system (which had been provided by the U.S. Geological Survey) was very generalized, WELUT entered more detailed coal and overburden thickness data provided by USGS through OTA for selected areas and developed a procedure for calculating reserves in different categories of stripping ratios and overburden thicknesses. The results of this project are summarized in the Appendix.

Methods Used

The first phase of the project required only slight modification of the RAM system programs to generate data already in the system on a lease specific basis. The study area contained 21 leases (in 14 blocks) and 12 PRLAs (in 6 blocks). Maps 6.1 - 6.3 show the boundaries of the Gillette

Map 6.1 North Section Gillette Review Area

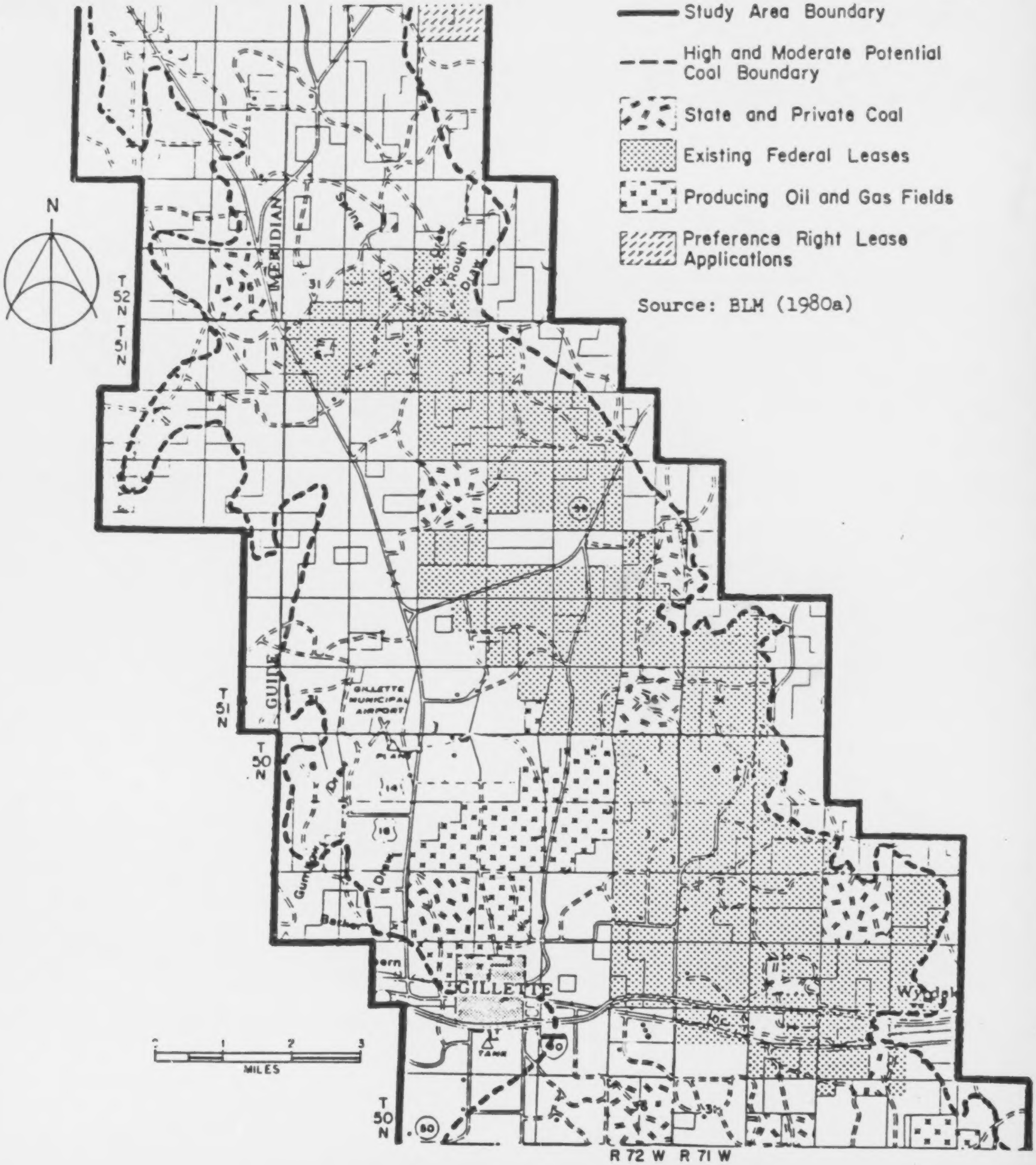
Committed Coal, Producing Oil and Gas Fields, and Preference Right Lease Applications



Source: BLM (1980a)

Map 6.2 Central Section Gillette Review Area

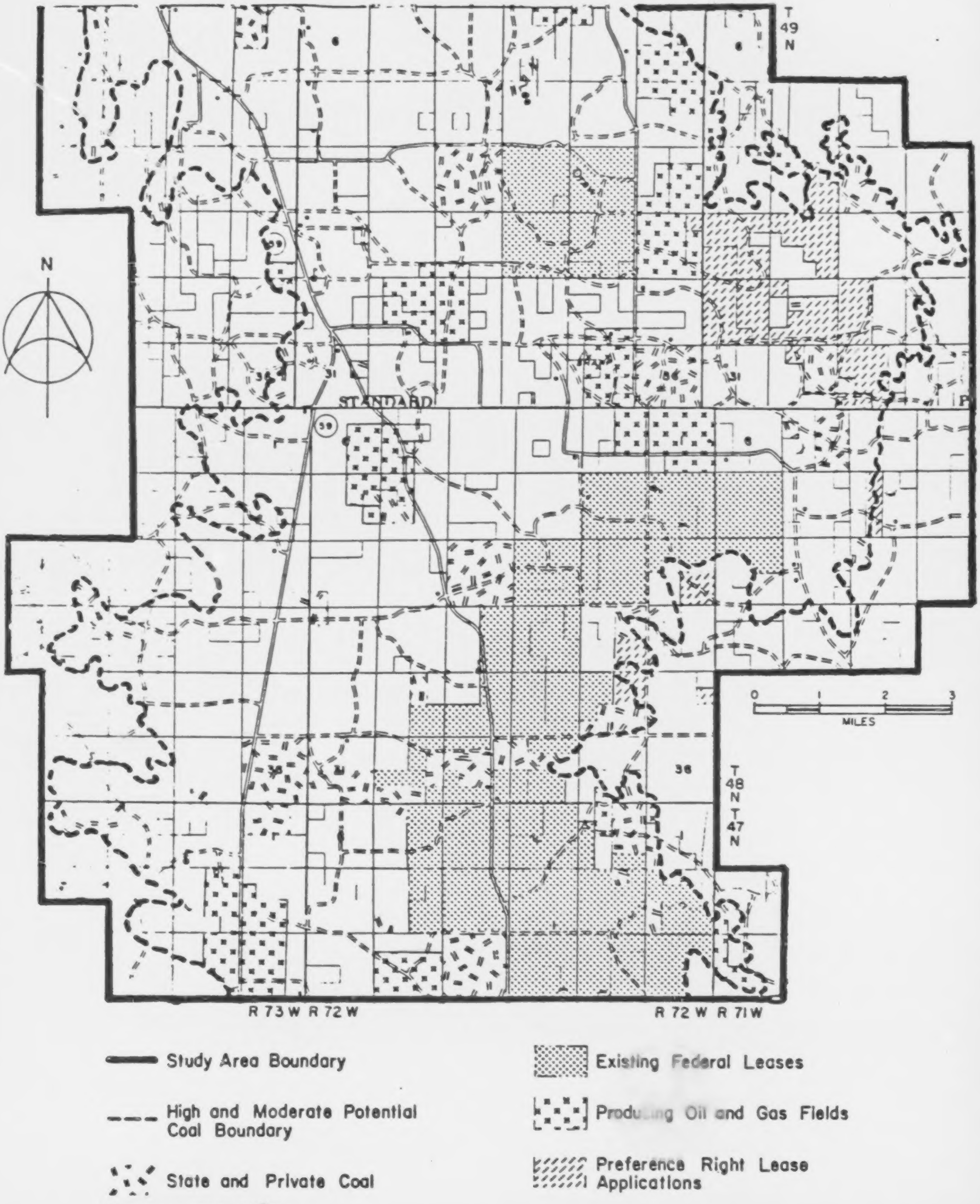
Committed Coal, Producing Oil and Gas Fields, and Preference Right Lease Applications



Source: BLM (1980a)

Map 6.3 South Section Gillette Review Area

Committed Coal, Producing Oil and Gas Fields, and Preference Right Lease Applications



Source: BLM 1980a

Review Area with location of existing leases and PRLAs. The coal reserve data that was already in the BLM data base was in a generalized form (seam thicknesses only) that did not allow evaluation of stripping ratios or maximum overburden depths. In the second phase of the project WELUT entered data from selected USGS Coal Resource Occurence/Coal Development Potential (CRO/CDP) quadrangle maps (1:24,000 scale) into the OTA data base. The data included: 1) the thicknesses of the Wyodak and Anderson coal seams and any other coal seams that are close enough physically and stratigraphically to be surface mined in connection with the Wyodak and Anderson seams and 2) thickness of overburden and interburden to a maximum depth of 500 feet.

The five quadrangles used were as follows (number in parentheses indicates the USGS Open File Report Number for CRO/CDP maps):

1. Gillette East (OFR 79-042)
2. Calf Creek (OFR 79-031)
3. The Gap (OFR 79-048)
4. Coyote Draw (OFR 79-049)
5. Moyer Springs (OFR 79-031)

These five quadrangles include all or parts of the six undeveloped lease blocks in the Gillette Area (Wildcat, Blue Diamond, Dry Fork, South Rawhide, East Gillette, and East Wyodak) and most of three out of six PRLA blocks in the area (see Maps 1.5 and 1.6 in Appendix 1 for location of leases and PRLAs in relation to the quadrangles). Calf Creek quadrangle is the most complex of the five with three strippable coal seams. The Gap quadrangle has two strippable coal seams (Felix and Wyodak) but the Felix seam was not included because it is relatively thin and only covers the west edge of the quadrangle which is outside the area of OTA's interest. The Wyodak seam is the only strippable seam in the remaining three quadrangles, although the seam is split in some areas.

After coal seam thickness and overburden and interburden thicknesses were entered into the OTA data base, coal reserves were calculated in the following categories of stripping ratios and overburden limits:

1. 0-3.5 cu yd/ton to a maximum of 350 feet of overburden
2. 0-4.5 cu yd/ton and 0-250 feet and 250-500 feet of overburden
3. 4.5-6.0 cu yd/ton and 0-250 feet and 250-500 feet of overburden

Procedures for calculating coal reserves in the different categories are described at the end of this appendix. Additional information on the method used for computing stripping ratios and overburden limits can be obtained from the Coal Rapid Assessment Methods Group (WELUT, U.S. Fish and Wildlife SErvice, 2625 Redwing Road, Fort Collins, Colorado 80526).

Reserve calculations in the first category fit OTA's screening criteria for on-site development of a lease block (development potential of several undeveloped leases appeared to depend on sufficient availability of reserves for on-site development and OTA needed more reserve information to evaluate these leases). Reserves in this category can be generally considered to be economic reserves, although not all these reserves would be suitable for export. Reserves in the other two categories fall into USGS's definition of high (0-4.5 cu yd/ton) and moderate (4.5-6.0 cu yd/ton) coal development potential. This data was developed to provide some evaluation of the coal reserve data that was used by BLM in updating the Gillette MFP. The two categories of overburden limits were chosen to get some feeling for the extent of reserves with high overburden limits.

Results

Table A.6.1 (leases) and A.6.2 (PRLAs) summarize the data on acres of potential alluvial valley floor (AVF), coal reserves (existing data base) and coal reserves calculated from CRO/CDP maps. Eight leases had areas of potential AFV's as mapped by BLM, but relatively small acreages are involved. However, all except one PRLA have potential AVF's and substantial percentages are involved—45% for Consol (1), 65% for Consol (2), and 80% for Peabody (P1). A comparison of acreages of potential alluvial valley floors based on regulatory review (see also Table A.6.3) does not show very good agreement with the BLM data provided to WELUT. BLM data appears to quite consistently underestimate potential alluvial valley floors. For example, 358 acres of the Buckskin lease and 240 acres of the Wyodak lease are under review as potential AVF, but the RAM data shows none in either case. The RAM data show small acreages of potential AVF at Rawhide (15 acres) and Eagle Butte (25 acres) but acreages under regulatory review are considerably higher (195 and 126 acres respectively).

A comparison of the RAM coal reserve used for updating the Gillette MFP with reserves calculated from CRO/CDP data indicates that the MFP data is considerably lower than actual reserves in the 0 to 3.5 strip ratio range (one exception being the South Rawhide lease which is very low based on the CRO/CDP data—something is wrong with this number but time limitations prevented identifying the specific reason). On several leases (Wildcat, Dry Fork, East Wyodak and Caballo) reserves are increased further when a 3.5 - 4.5 strip ratio is considered (see tables at the end of the Appendix).

A significant result from the CRO/CDP calculations is confirmation that the Wildcat lease has sufficient reserves to support an on-site synthetic

TABLE A.6.1 - Lease Data, Gillette Area

Block Name (No.)	Lease Numbers	Acres		Potential Alluvial Valley Floor (Acres)	Coal Reserves (MT)[1]	
		Actual	Computed		BLM/USGS	OTA/USGS
Wildcat (7)	W0220516	1571	1800	10	162.9	390.3[2]
Blue Diamond (8)	B037423	40	0	0	0	0
Buckskin (9)	W0325878	599	635	0 (358)[3]	78.2	—
Rawhide (10)	W5036	5457	5425	15 (195)[3]	545.8	—[4]
Eagle Butte (11)	W0313773	3520	3285	25 (126)[3]	317.3	—[4]
Dry Fork (12)	W0271199	640	135	0	10.1	10.5
	W0271200	760	160	0	12.0	14.5
	W0271201	2180	1740	0	139.1	141.4
		3580	2035	0	161.2	166.4
S. Rawhide (13)	W5035	4782	4680	50	361.7	88.3[7]
E. Gillette (14)	W0311810	1263	985	0	79.0	76.8
	W0312311	880	830	5	47.9	62.8
	W0313668	2200	1805	0	130.0	186.5
		4543	3620	5	256.9	326.1
Wyodak (15)	W0111833	80	90	0	5.1	9.2
	W0313666	1560	1230	0	78.8	163.3
	W073289	240	270	0	14.9	14.0
		1880	1590	0 (240)[3]	98.8	186.5
East Wyodak (17)	W0313667	2560	2605	5	115.6	209.8
Caballo (18)	W3397	5251	5145	65	342.4	436.6[5]
	W49644	80	90	0	6.0	0
		5331	5235	65 (0)[3]	348.4	436.6
Pronghorn (20)	W58112	840	850	0	62.3	—
Rojo Caballos (21)	W23929	3160	3145	0	204.9	—
Cordero (22)	W8385	6560	6150	10 (0)[3]	357.7	—

Table A.6.1 (continued)

Footnotes:

[1] BLM/USGS data based on generalized coal seam thicknesses with stripping ratio 0-6.0 cu yd/ton and overburden limits of 0 - 500 feet. OTA/USGS is calculated from coal and overburden thickness data on 1:24,000 USGS Coal Resource Occurrence/Coal Development Potential Maps for a strip ratio of 0 - 3.5 cu yd/ton of coal and overburden 0 -350 feet.

[2] Includes only eastern portion of the lease.

[3] Number in parentheses is the number of acres of potential alluvial valley floor based on regulatory review of permit applications (see Table A.6.3).

[4] Reserves computed for eastern part of both leases, but not shown because only a small percentage of total lease was included in the quadrangles that were entered into the OTA data base.

[5] Does not include the southern end of the lease.

[6] Computed from lease boundaries as entered into the BLM data base.

[7] There is some error in this computation, but time and budgetary limitations prevented pinpointing the specific problem.

TABLE A.6.2 - Preference Right Lease Application Data, Gillette Area

		Acres 1/			Coal Reserves (MTons)	
PRLA Block (No.)	PRLA Number	Actual	Computed	Potential Alluvial Valley Floor (Acres)	BLM/USGS	OTA/USGS 2/
Consol (1) (P7)	W11128	999	830	240	37.4	—
	W8312	1575	1500	1240	72.3	—
	W8307	3036	2815	825	132.3	—
		5610	5145	2305	242.0	
Consol (2) (P8)	W8308	2544	2095	1280	93.5	656.1
	W8309	1990	1910	1310	126.3	897.1
		4534	4005	2590	219.8	1,553.2
Consol (3) (P9)	W8310	1200	135	80	8.6	56.8
		2440	175	370	14.9	100.8 3/
		3640	310	450	23.5	157.6
Peabody (P1) (P10)	W26198	2508	2475	2250	25.8	0.9
	W26199	640	630	275	8.3	0.1
	W32061	80	90	45	1.0	0
	W32062	160	45	165	1.4	0
		3388	3240	2735	36.5	1.0
Peabody (P2) (P11)	W32063	520	230	0	14.2	1.4

Footnotes:

1/ Computed from lease boundaries as entered into the BLM data base.

2/ Stripping ratio of 0 - 3.5 cu yd/ton of coal and overburden 0 - 350 feet. Calculated from coal and overburden thickness data on 1:24,000 USGS Coal Resource Occurence/Coal Development Potential Maps.

3/ Includes most, but not all of the area covered by these PRLA blocks.

Table A.6.3 ALLUVIAL VALLEY FLOOR (AVF) SUMMARY TABLE DEVELOPED COAL RESERVES IN POWDER RIVER BASIN

Leaseblock	Leaseblock Area (Acres)	Acres of Designated AVF Significant to Farming	Acres of Designated AVF Not Significant to Farming	Acres of Stream Valley Under Study as Potential AVF	Name of Stream
Rosebud	8,226	— [1]	—	386	East Fork Armells Creek
Big Sky (g) [2]	4,307	0 [3]	0	0	Emile (Coalbank) L & Miller Coulee
		—	—	275	Lee Coulee
Spring Creek	2,347	0	0	0	Spring Creek
		—	—	257	South Fork Spring Creek
West Decker (g)	4,[illegible]51	0	0	0	Spring & Pearson Creek
East Decker (g)	9,410	—	—	386	Deer Creek
Buckskin	599	—	—	358	Rawhide Creek
		—	—		Spring Draw
Rawhide (g)	5,457	0	143	0	Rawhide Creek
		0	52	0	Little Rawhide Creek
Eagle Butte (g)	3,520	0	126	0	Little Rawhide Creek
		—	—	10	Dry Fork Powder River
Wyodak (g)	1,880	—	—	240	Donkey Creek
Caballo	5,331	0	0	0	Tisdale Creek and Gold Mine Draw
Belle Ayr (g)	2,360	0	0	365	Caballo Creek
Rojo Caballo	4,000	0	0	0	Clabaugh and Desmet Draw
Cordero (g)	6,560	—	—	640 (non-federal)	Belle Fourche River
Coal Creek	5,806	0	116	0	Coal Creek
		0	616	0	E. Fork Coal Creek and Tributa
		0	70	0	Middle Fork Coal Creek
		0	44	0	Dry Creek Tributary
Jacobs Ranch (g)	4,352	—	—	240	Little Thunder Creek Burning Coal Draw
Black Thunder (g)	5,884	—	—	545	N. Prong Little Thunder Creek and Little Thunder Creek
David Johnston (g)	9,662	0	0	0	—
TOTALS:					
Acres:	84,662	0	1,167	3,702	
Recoverable Reserves: (million tons)	5,200	0	61	335	

[1] —: indicates no determination made

[2] g: Refers to so-called "grandfathered mines"; that is, those mines which were operating prior to passage of SMCRA.

[3] 0: indicates determination by regulatory agency that no AVF's are along indicated streams

fuels plant (the 390 million tons on Table A.6.1 only covers half the lease), and that the East Wyodak lease also has sufficient reserves to support a synthetic fuels plant. This additional information did not result in any changes in OTA's ratings of these leases in terms of production prospects by 1991, but it did identify the East Wyodak lease as having production potential in the post 1991 period.

Table A.6.4 shows calculations for total reserves in the five CRO/CDP quadrangles in the different stripping ratio and overburden categories. Reserves were calculated for both total area and for the same area excluding clinker (burned coal). Clinker areas probably have less coal than the CRO/CDP isopach maps indicate, but are probably not devoid of coal, so actual reserves probably lie somewhere between the two numbers. According to the CRO/CDP data, the five quadrangles contain from 24.0 to 25.9 billion tons of coal with high development potential. Increasing stripping ratio reserves from 4.5 to 6.5 only increases this number by 0.7 to 0.8 billion tons. Reserves that would be considered economic today (or in the not too distant future) range from 16.4 to 17.6 billion tons. These numbers are suprising in light of the fact that the BLM data which were used to update the Gillette MFP indicated a total of only 15.6 billion tons of coal with high and moderate development potential in the entire review area. This number is about 10 billion tons lower than reserves calculated using the same USGS criteria from the CRO/CDP data for about one third of the Gillette review area (The Gillette area contains about 15 quadrangles for which CRO/CDP maps have been prepared). One reason for this difference is that the OTA analysis added additional coal seam data to that used in the BLM analysis (for example, in the Calf Creek quadrangle OTA data included three strippable seams and BLM only two), but time limitations prevented

TABLE A.6.4 - Strippable Coal Reserves with High and Moderate Coal Development Potential in Five 7 1/2' Quadrangles[1] Campbell County, Wyoming[1]

Area Computed	Coal Resources with High[2] Development Potential (10^9 ton) 0-4.5 strip ratio			Coal Resources with Moderate[2] Development Potential (10^9 ton) 4.5-6.0 strip ratio			Economic Reserves[3]
	0-250 ft	250-500 ft	0-500 ft	0-250 ft	250-500 ft	0-500 ft	
With Clinker	25.9	0.6	26.5	0.7	0.1	0.8	17.6
Excluding Clinker	24.0	0.6	24.6	0.6	0.1	0.7	16.4

Footnotes:

[1] The five quadrangles are Gillette East, Calf Creek, The Gap, Coyote Draw and Moyer Springs.

[2] In Campbell County USGS defines high development potential as a strip ratio of 0-4.5 cu yd/ton coal to a maximum depth of 500 feet overburden, and moderate development potential as a strip ratio of 4.5-6.5 up to the same overburden limit.

[3] Strip ratio of 0-3.5 cu yd/ton coal and 0-350 feet of overburden. Reserves within this range were considered by OTA to be economically mineable in today's markets although reserves with strip ratio of 2.5-3.5 would probably have to be developed for on-site conversion.

determining more precisely the reasons for the differences.

Conclusions

The data reported here must be viewed with some caution for several reasons:

1. Time and budgetary limitations did not allow checking and resolution of a number of discrepancies that were identified in the BLM and OTA outputs. Calculations were based on the boundaries of leases and PRLAs as entered into the BLM data base. A comparison of acreages computed from the BLM and OTA data bases and actual acreages shows reasonable agreement in most cases (see Tables A.6.1 and A.6.2) but in several instances computed acreage are 1000 or more acres lower than the actual acreage. The CRO/CDP number for the South Rawhide lease is far lower than it should be and the reason for this was not identified.

2. The CRO/CDP maps represent the best regional data that is available on coal and overburden thickness, but the variable density of data points that were used to develop the isopach maps means that calculations based on isopach lines drawn in areas of few data points are less reliable than where data points are closer together.

With these caveats in mind, however, a number of conclusions can be drawn from the results of this project:

1. Existing leases appear to be concentrated in areas of lower occurence of alluvial valley floors than PRLAs and unleased areas (28% of the whole Gillette Review Area was identified as having potential alluvial valley floors in the MFP update). A surprising result of comparing the BLM

potential AVF data with potential AVF as identified by regulatory review is that BLM may have been conservative in its identification of potential AVFs on unleased areas. This does not mean that leasing will be prohibited in acres identified as having potential alluvial valley floors (most, if not all, will probably be determined to be not significant to agriculture) but it does mean that reclamation issues concerning protection of the essential hydrologic functions of non-agriculturally significant alluvial valley floors may well increase in significance with new leasing of coal.

2. There appears to be severe deficiencies in the coal reserve data that were used by BLM to update the Gillette MFP. Coal resources with high and moderate coal development potential could be as much as three to five times higher than the numbers used by BLM. For actual tract delineation more conservative stripping and overburden limits should be used, but even if more stringent limits are set, actual available reserves (less than 3.5 strip ratio) may be more than twice the number determined by BLM. More complete delineation of these areas would allow greater flexibility in tract delineation for new leasing than is indicated by the updated Management Framework Plan which is being used for the first round of planned leasing in 1982.

3. The modifications to WELUT's RAM system that resulted from this project have good potential for improving the land use planning process in the Federal Coal Management Program in several ways:

- The ability to obtain lease specific data provides an opportunity to check the accuracy of data that is entered into the system through comparison with lease specific data from other sources.

-- The direct use of CRO/CDP maps (or other comparable data) allows mroe accurate identification of coal reserves available for new leasing, and creates considerable flexibility in modifying reserve estimates as economic conditions and mining practices change.

-- Although it was not done as part of this project, the coal and overburden data that was entered into the OTA data base could be manipulated without much difficulty to generate potential lease tracts in a variety of configurations in acordance with various economic, geologic and land use planning criteria. This would not eliminate the need for careful site specific work in final tract delineation, but it could greatly facilitate the USGS in the tract delineation process.

Procedure for Calculating Coal Reserves in Different Categories of Stripping Ratios and Overburden Thickness

1. Maps were digitized for constant thicknesses of:
   a) Overburden
   b) Interburden
   c) Coal Seams

2. Each thickness of the above three categories was held in a separate data plane for analysis.

3. OTA (Boulding) verified the equation used for calculating the stripping ratio:

$$SR = \frac{\text{Cubic Yards of overburden removed}}{\text{Tons of coal recovered}} \qquad (1)$$

4. OTA (Boulding) instructed WELUT on the definition of "overburden" and "coal recovered" in Equation 1.
   Overburden was specified to include overburden and interburden thicknesses together. Coal includes the coal seam thicknesses together.

5. Maps were created for all possible combinations of overburden and interburden thicknesses. These became the new overburden thicknesses. Maps were created for all possible coal seam thicknesses.

6. There is a simple relation that enables one to compute stripping ratio given thickness data alone (assuming coal density of 1770 tons per acre-ft). One acre-ft is 43560 cu-ft. Divide 43560 by 27 to obtain 1613.33 cu-yd. This is the volume in cubic yards of one acre foot of overburden.

   One acre foot of coal weighs 1770 tons, using the assumed value as confirmed by OTA (Boulding).
   Dividing 1613.33 by 1770 gives 0.91488, a factor which can be used for each acre-ft of overburden over each acre-ft of coal to obtain stripping ratio.

   Example 1: Assume one acre-ft of overburden overlies one acre-ft of coal. What is the Stripping Ratio?

$$\begin{aligned} SR &= \text{Factor} * (\text{ overburden acre-ft / coal acre-ft }) \\ &= 0.91488 * (1 / 1) \\ &= 0.91488 \end{aligned}$$

   Example 2: Assume 37.5 acre ft of overburden overlies 10 acre-ft of coal.

$$\begin{aligned} SR &= 0.91488 * (37.5 / 10) \\ &= 3.41808 \end{aligned}$$

7. It should be obvious that at any point where 37.5 ft of overburden overlie 10 ft of coal, the Stripping Ratio will be 3.41808. Thus we can generalize the Equation (1) to:

$$SR = \frac{\text{Thickness of Overburden}}{\text{Thickness of Coal}} * \text{FACTOR} \qquad (2)$$

8. A table or matrix was made with all possible coal thicknesses as column headings and all possible overburden thicknesses as row headings. Entries into this table were the Stripping Ratios of the row and column thickness combinations, using Equation (2). The data were scanned to eliminate those combinations that did not physically exist in the mapped area so that these particular elements could be ignored in later calculations.

9. OTA specified the Stripping Ratio limits and the overburden ranges to be considered.

10. For each specification of Stripping Ratio, all elements in the Stripping Ratio matrix were used to identify the boolean combination of overburden maps and coal thickness maps needed to create a map element for the Stripping Ratio. That is to say, all elements that satisfied the Sripping Ratio limits were chosen, and the maps associated with the column headings (overburden thickness) were combined with the maps associated with the row headings (coal thickness) with a Boolean "AND" and each of these individual maps were combined with a Boolean "OR" to give a map containing all map elements satisfying the Stripping Ratio limits.

11. New map elements containing overburden thicknesses for the specified ranges were created by combining appropriate thicknesses using the Boolean "OR".

12. Finally the map elements satisfying the Stripping Ratio limits were combined with the map elements satisfying the overburden limits to give the map elements satisfying both conditions by using the Boolean "AND".

13. Coal reserves were calculated for the resultant map elements using the "STRIP" command in the SAGIS WINDOW program. These reserve estimates were used in compiling the tables included in the WELUT report to OTA.

TABLE A.6.5

Overburden Depth: 0 - 350 ft
Stripping Ratio : 0 - 3.5 cu yd / ton

FEDERAL LEASES	TONS OF COAL	EXCLUDING CLINKER
B037433	0	0
W0111833	9,159,750	8,165,010
W0220516	390,284,800	390,284,800
W0271199	10,487,250	8,003,940
W0271200	14,522,850	10,181,040
W0271201	141,352,200	140,449,500
W0311810	76,782,590	74,074,500
W0312311	62,790,740	62,790,740
W0313666	163,268,300	140,037,100
W0313667	209,798,100	207,157,200
W0313668	186,460,600	169,495,200
W0313773	209,851,200	209,851,200
W0325878	0	0
W073289	14,044,950	14,044,950
W3397	436,641,300	436,469,500
W49644	0	0
W5035	88,291,140	88,291,140
W5036	81,057,140	81,057,140

PRLA's	TONS OF COAL	EXCLUDING CLINKER
W26198	929,250	531,000
W26199	132,750	132,750
W32061	0	0
W32062	0	0
W32063	1,380,600	690,300
W8307	0	0
W8308	656,069,900	525,656,300
W8309	897,104,900	722,312,200
W8310	56,778,500	43,064,010
W8311	100,803,300	40,973,730

Total 5 Quads	TONS OF COAL	EXCLUDING CLINKER
OB: 0 - 350 => and => SR: 0 - 3.5 =>	17,594,400,000	16,371,190,000

TABLE A.6.6

Overburden Depth: 0 - 250 ft
Stripping Ratio : 0 - 4.5 cu yd / ton

FEDERAL LEASES	TONS OF COAL	EXCLUDING CLINKER
B037433	0	0
W0111833	9,159,500	8,165,010
W0220516	528,304,100	528,304,100
W0271199	10,487,250	8,003,940
W0271200	14,522,850	10,181,040
W0271201	150,311,900	149,409,200
W0311810	76,782,590	74,074,500
W0312311	62,790,740	62,790,740
W0313666	163,268,300	140,037,100
W0313667	347,114,500	341,486,100
W0313668	186,460,600	169,495,200
W0313773	286,030,100	286,030,100
W0325878	0	0
W073289	14,044,950	14,044,950
W3397	529,732,600	529,559,000
W49644	0	0
W5035	88,291,140	88,291,140
W5036	275,204,900	275,204,900

PRLA's	TONS OF COAL	EXCLUDING CLINKER
W26198	929,250	531,000
W26199	132,750	132,750
W32061	0	0
W32062	0	0
W32063	1,380,600	690,300
W8307	0	
W8308	1,009,318,000	805,865,000
W8309	1,271,957,000	1,020,568,000
W8310	88,006,160	66,428,100
W8311	218,685,300	85,775,970

Total 5 Quads	TONS OF COAL	EXCLUDING CLINKER
OB: 0 - 250 =>		
and =>	25,861,300,000	23,961,840,000
SR: 0 - 4.5 =>		

TABLE A.6.7

Overburden Depth: 250 - 500 ft
Stripping Ratio : 0 - 4.5 cu yd / ton

FEDERAL LEASES	TONS OF COAL	EXCLUDING CLINKER
B037433	0	0
W0111833	0	0
W0220516	96,973,000	96,973,000
W0271199	0	0
W0271200	0	0
W0271201	0	0
W0311810	0	0
W0312311	0	0
W0313666	0	0
W0313667	0	0
W0313668	0	0
W0313773	0	0
W0325878	0	0
W073289	0	0
W3397	171,690	171,690
W49644	0	0
W5035	0	0
W5036	0	0

PRLA's	TONS OF COAL	EXCLUDING CLINKER
W26198	0	0
W26199	0	0
W32061	0	0
W32062	0	0
W32063	0	0
W8307	0	0
W8308	0	0
W8309	10,499,640	10,499,640
W8310	0	0
W8311	0	0

Total 5 Quads	TONS OF COAL	EXCLUDING CLINKER
OB:250 - 500=>		
and =>	568,515,100	558,957,100
SR: 0 - 4.5 =>		

TABLE A.6.8

Overburden Depth: 0 - 250 ft
Stripping Ratio : 4.5+ - 6.0 cu yd / ton

FEDERAL LEASES	TONS OF COAL	EXCLUDING CLINKER
B037433	0	0
W0111833	0	0
W0220516	9,027,000	9,027,000
W0271199	0	0
W0271200	0	0
W0271201	0	0
W0311810	0	0
W0312311	0	0
W0313666	0	0
W0313667	0	0
W0313668	0	0
W0313773	0	0
W0325878	0	0
W073289	0	0
W3397	0	0
W49644	0	0
W5035	0	0
W5036	0	0

PRLA's	TONS OF COAL	EXCLUDING CLINKER
W26198	0	0
W26199	0	0
W32061	0	0
W32062	0	0
W32063	0	0
W8307	0	0
W8308	5,263,980	4,725,900
W8309	40,329,440	32,258,240
W8310	2,961,210	2,070,900
W8311	0	0

Total 5 Quads	TONS OF COAL	EXCLUDING CLINKER
OB: 0 - 250 =>		
and =>	650,129,700	609,853,400
SR:4.5 - 6.0=>		

TABLE A.6.9

Overburden Depth: 250 - 500 ft
Stripping Ratio : 4.5+ - 6.0 cu yd / ton

FEDERAL LEASES	TONS OF COAL	EXCLUDING CLINKER
B037433	0	0
W0111833	0	0
W0220516	7,168,500	7,168,500
W0271199	0	0
W0271200	0	0
W0271201	0	0
W0311810	0	0
W0312311	0	0
W0313666	0	0
W0313667	0	0
W0313668	0	0
W0313773	0	0
W0325878	0	0
W073289	0	0
W3397	0	0
W49644	0	0
W5035	0	0
W5036	0	0

PRLA's	TONS OF COAL	EXCLUDING CLINKER
W26198	0	0
W26199	0	0
W32061	0	0
W32062	0	0
W32063	0	0
W8307	0	0
W8308	0	0
W8309	1,062,000	1,062,000
W8310	0	0
W8311	0	0

Total 5 Quads	TONS OF COAL	EXCLUDING CLINKER
OB:250 - 500=>		
and =>	137,276,800	134,012,000
SR:4.5 - 6.0=>		